PROFILE 230

Dassault Mirage Variants

Editorially speaking . . . No. 3

Your letters (see *Guidelines on Letters)* are beginning to come in. The most consistent theme is what are to be the new titles after No. 235? Well, a few more appear on the inside back cover of this *Aircraft Profile*. Very soon I hope to announce a competition. You, the reader will select No. 250!

We at Windsor cannot be sure just where *Aircraft Profiles* or our correspondents are going to turn up next. It may be cheating a little bit but we were quite impressed when an air mail letter arrived from Ulan Bator, Mongolia Republic *(see stamp reproduction below)*. The letter, from an old western world colleague, assured us that not only had the correspondent arrived without incident in an Antonov An-24 at U.B. but so had the nation's first *Profile*. Naturally enough it was the recently published No. 216, Petlyakov Pe-2. CHARLES W. CAIN

ABOUT THE AUTHOR

Although author John F. Brindley, a newcomer to *Aircraft Profiles*, works professionally in Geneva, he travels as widely as opportunity presents. Yet, he still finds time to chalk up an impressive "first" with his outline of the unfinished history of Europe's most successful combat jet of the 1960–70s . . . the Marcel Dassault-Breguet Aviation Co's Mirage. The MD-BAC merger was officially approved as recently as July 21, 1971. Avions Marcel Dassault already held some 62% of the Breguet capital but this move at least assures that one of France's most illustrious aviation names—Breguet—will not disappear as have others elsewhere through mergers. John Brindley's name will be seen in connection with other *Aircraft Profiles* to come, as well as in the companion Hylton Lacy Publishers *Men and Machines* series. Two hardback volumes by JFB will appear, the first being *French Fighters of World War Two*.

YOUR COMMENTS

The 50-Year commemoration is for the Mongolia Republic and not for the Polikarpov U-2 (later Po-2) which dates from 1927. An impressive 20,000 were built from 1928–52.

F-105 Thunderchief

Of the *F-105 Profile* No. 226, let me say that it's always an honour to have your airplane selected for your publication . . .

ROY E. WENDELL,
Director of Public Relations,
Fairchild Hiller,
Republic Aviation Division,
Farmingdale, L.I., N.Y.

Jungmann approval

We (The Swiss Institute of Transport and Communications) appreciated the opportunity to cooperate in (Mr. L. F. Sarjeant) story on the Bücker Bü 131 Jungmann. Congratulations to the author on his outstanding report on this glorious aircraft!

VERKEHRSHAUS DER SCHWEIZ,
Luzern, Lucerne, Switzerland.

Between-the-wars

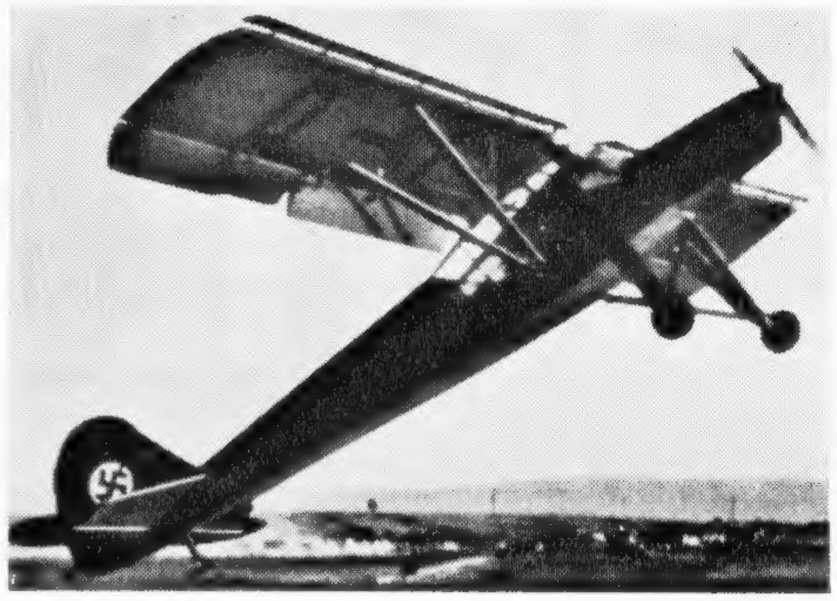
The continuing excellence of *Aircraft Profiles* prompts me to ask if you will consider some more British "between-the-wars" (1920s and 1930s) types such as the Boulton Paul Sidestrand, the Fairey Fox and Fairey IIIf and the Westland Wapiti . . . and civil types like Imperial Airways used.

J. C. MACCULLOCH,
E. Kilbridge, Glasgow, Scotland.

EDITORIALLY SPEAKING . . . Tempting, tempting! For a start, the Bristol Fighters of the 1920–30s is scheduled as *Aircraft Profile* No. 240. But both the Fairey IIIf and the Westland Wapiti exist in *Profile* Nos. 44 and 32 (in Volume 2).

Your next AIRCRAFT PROFILE*

No. 228 Fieseler Fi 156 Storch variants



Once again Richard P. Bateson tackles a German subject, this time the ubiquitous Fieseler *Storch* (Stork). This was one of the first S.T.O.L. (Short Take-Off & Landing) types designed as such. Many famous names are among those who flew or were flown in examples of the Storch, possibly the most famous episode was that involving the rescue of the imprisoned Mussolini. Surprisingly, the Fi 156 has never been fully researched for publication. Until now. And worth waiting for!

****The Publishers advise that* Profile No. 228 *has been held over from strict numerical sequence issue for various technical reasons.***

Hawks in Bolivia

Our firm, the Deep River Armory, Inc., of Houston, Texas, is engaged in research on the Chaco War, 1932–35. Can anyone advise us the number of Curtiss Export Hawks sold to Bolivia? Export was stopped by a Presidential order; we have had no luck in tracing the aircraft—perhaps because our normal business is small arms. JAMES B. HUGHES JR.,
President and Managing Director.

EDITORIALLY SPEAKING . . . Possibly these would have been Hawk Is and developments of the U.S. Navy (air-cooled radial engine) models rather than the U.S. Army (liquid-cooled inline) Hawk biplanes. Mr. Hughes has rekindled our curiosity too!

Guidelines on letters

Here are a few simple guidelines for readers wishing to write to *Aircraft Profiles* and its authors: (1) letters should be brief and, preferably, constructive; (2) letters intended for individual authors will be sent on to them; (3) except for sales queries, correspondents should refrain from submitting long lists of questions, especially those which have no bearing on existing or forthcoming *Profiles;* (4) the Editor reserves the right to extract relevant sections from letters for publication unless correspondents signify otherwise; and (5) because the Editor has only limited time to deal with additional correspondence, similarly he reserves the right to delay individual replies or, where it appears that no reply is necessary, simply to accept gratefully readers' appreciation of the time factor.

Address your letters to:

Editorially speaking . . .
Aircraft Profiles,
Profile Publications Ltd.,
Coburg House, Sheet Street,
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Aircraft Profiles

This new series of Aircraft Profiles commenced with No. 205 and continues the pattern of the complete history of the Aircraft of the World established by the early Aircraft Profiles numbered 1 to 204.

The series is edited by Charles W. Cain, for many years Editor of *The Aeroplane Spotter* of World War Two and beyond, and many well-known names have appeared among the authors and artists contributing to the series.

The continuing interest in and support of the Aircraft Profiles series has encouraged the Publishers to enlarge the contents of the Profiles. From No. 216 onwards there are 28 pages in all aircraft Profiles. There are 4 pages in colour—which allows the presentation of additional side views, badges, symbols, etc.

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213 Kawanishi N1K Shiden 'George'
214 Grumman TBF/Eastern TBM Avenger variants
215 Arado Ar 234 Blitz
216 Petlyakov Pe-2 variants
217 Brewster Buffalo variants
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228 Fieseler Fi 156 Storch variants
229 Vickers-Armstrongs Warwick variants
230 Dassault Mirage variants
231 Lublin R.XIII variants
232 Martin Maryland & Baltimore variants
233 Kawanishi 4-Motor Flying-Boats (H6K 'Mavis' & H8K 'Emily')
234 Heinkel He 177 Der Greif
235 Avro Lancaster Mk II
236 Mitsubishi A6M5 Zero-Sen ('Zeke 52')
237 Fairey Barracuda Marks I-V
238 Mikoyan MiG-21 ('Fishbed') variants
239 LTV A-7 Corsair II
240 Bristol Fighter ('Brisfit') 1920-30s variants

Whilst every effort will be made to maintain this programme, the Publishers reserve the right to change the sequence.

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The four production versions of the Mirage III seen in flight together: (left to right) Mirage IIIR; Mirage IIIB No. 224; Mirage IIIC No. 7; and Mirage IIIE No. 402. Note that Mirage III production numbers on French Air Force aircraft do not run consecutively—there are gaps between the ranges allocated to the various versions.
(All photographs are credited to Avions Marcel Dassault, except where specifically stated)

Dassault Mirage Variants

by John F. Brindley

MIRAGE, as in English, too, "an optical illusion" but also in French, another meaning: "To appear indistinctly, in vague and often magnified or threatening shape".

THE MIRAGE MATERIALIZES

In June 1967, the name "Mirage" literally shot into prominence through newspaper headlines around the world. Israel's new Mirages were the spearhead of attack by the Israel Defence Force/Air Force in what has come to be known as the "Six-Day War". In capable hands, the French-produced Mirage proved what hitherto had been understood by knowledgeable aircraft engineers and military aviation specialists; in its class, the Mirage was and is *par excellence*. No military aircraft of the 1970s, emanating from Western Europe, including the United Kingdom, has a bigger or better reputation than Avions Marcel Dassault's Mirage.

Yet, strangely enough, the Mirage materialized from one of aviation's less fruitful concepts—the "light fighter" whose origins lay in the 1950s' Korean War where the Soviet-designed MiG-15 (Nato code: "Fagot") attracted considerable attention. The Western Powers were impressed by the relatively uncomplicated approach resulting in a swept-wing jet fighter with good performance and heavy armament.

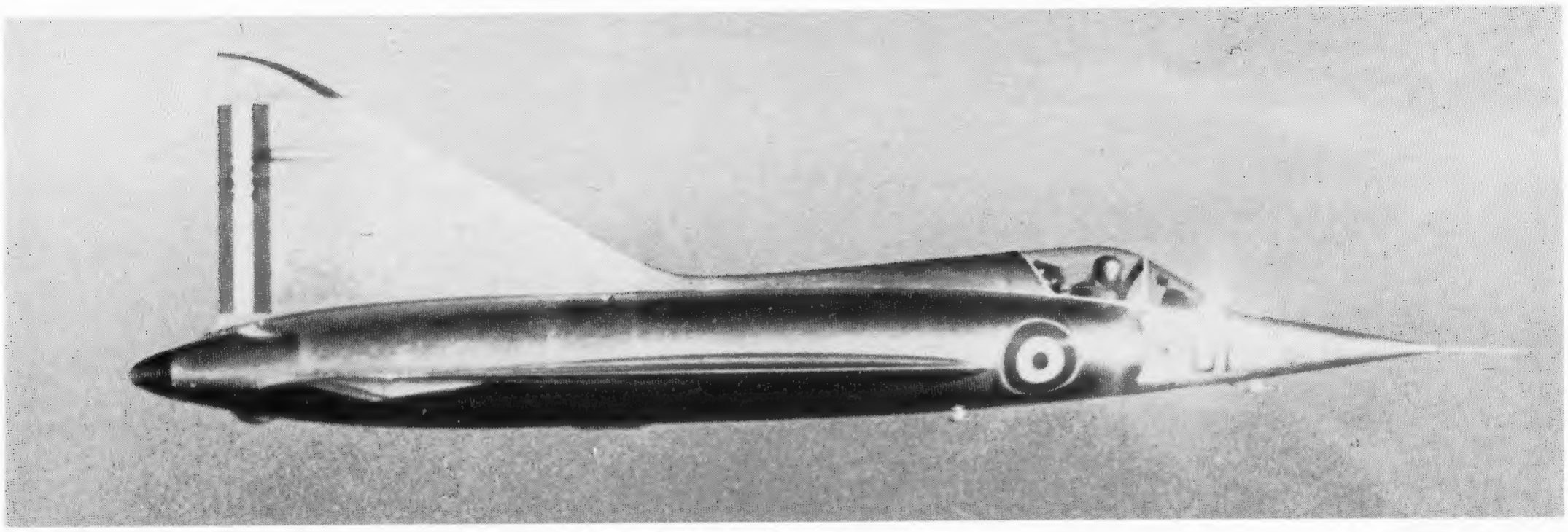
The French Defence Ministry was reasonably quick off the mark with a 1952 specification* which, among other desirable characteristics, demanded climb capability to 60,000 feet within six minutes of take-off.

Three French manufacturers responded to the specification: Dassault; Sud-Est (with the SE 212 Durandal) and Sud-Ouest (SO 9000 Trident). Lacking suitably powerful jet engines to give the performance required, all three opted for the mixed turbojet/rocket powerplant concept.

Dassault's design, the MD 550 Mirage I, was powered by two 1,640-pounds (static) thrust Armstrong-Siddeley Viper turbojets (for which Dassault had a production licence, as the MD-30), with provision for the installation of a 3,300-lbt SEPR 66 rocket motor in the rear fuselage. The Mirage I was a compact tailless delta-wing design, characterized by a large vertical fin and rudder. The prototype, whose full designation was MD 550–01, made its first flight on June 25, 1955.

Weighing-in at just under 11,200-lb loaded, the Mirage I was tested initially without its rocket motor being fitted; the best performance achieved in this

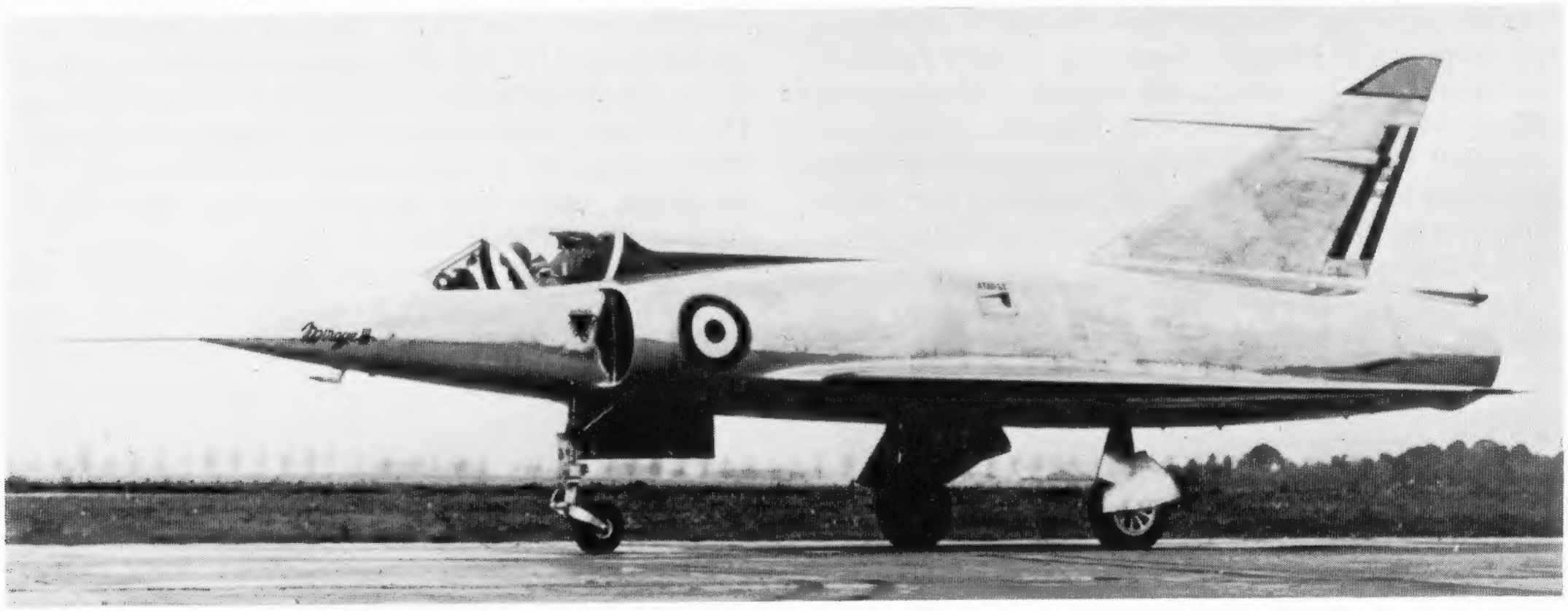
* Other Western Powers also followed suit: the UK with the Folland (Hawker Siddeley) Midge/Gnat; the USA with the Douglas A-4 Skyhawk; and, Italy with the Fiat G.91. The latter two are not true fighters, the Skyhawk being Attack category and the G.91 Strike Fighter—whereas the Gnat is a lightweight fighter with strike capability, namely a basic 2×500-lb bombs or 12×3-in ground-attack rockets.



The MD 550 Mirage I light fighter in its original configuration. It first flew on June 25, 1955. (Photo: Paul Cadé)

After initial flight trials, the Mirage I–01 was modified and re-engined. Note the redesigned vertical tail surfaces.

Late in 1956, the Mirage III–001 was completed, making its first flight on November 17 of that year.

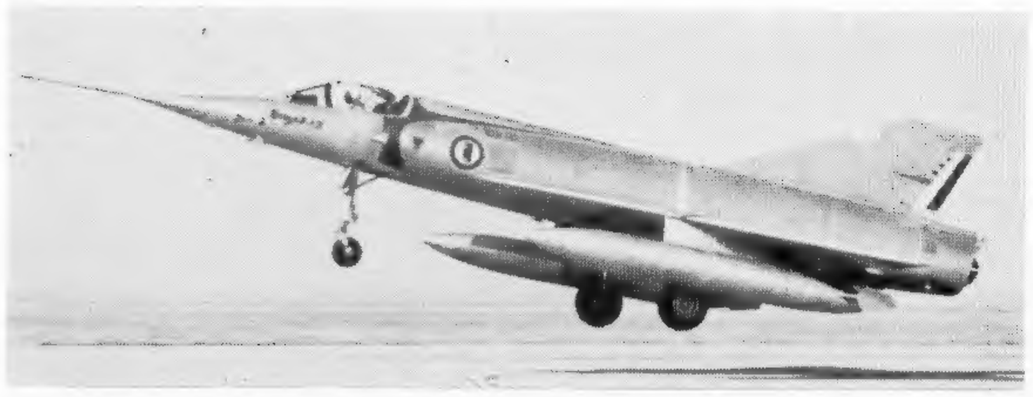


configuration being Mach 1·15, and then only in a shallow dive. Several modifications were made after the initial series of flight trials, the most obvious being a redesign of the vertical tail surfaces. New Viper engines, with reheat, were also fitted. The reworked Mirage then attained Mach 1·3 in level flight with the aid of its rocket motor.

Flight tests of all three competing designs—Mirage, Durandal and Trident—revealed the limitations of the "light fighter" concept and the French abandoned it. Functionally, the main objection was the limited endurance but, more important, there just was not room to carry the increasingly large electronics package which an interceptor had to carry to have true all-weather capability.

Dassault had already given thought to enlarged versions of the Mirage, the first being the Mirage II. This project was to be powered by two Turbomeca Gabizo engines, rated at 2,400-lbt dry and at 3,300-lbt with reheat. However, the French military authorities were more attracted by the proposed Mirage III, which was even larger than the Mirage II. (There was even a 1955 proposal for a Mirage IV heavy fighter, see section "The Mirage IV Bomber".) Initially, the Mirage III was projected as a twin-engined aircraft, to be powered by two 3,300-lbt Dassault R-70 engines (developed Vipers) but this was changed with the development progress of the SNECMA Atar turbojet. Thus, the Mirage III was first powered by the Atar 101G.1, rated at 9,900-lbt with reheat, with provision being made for the installation of an SEPR 66 rocket motor under the rear fuselage.

The prototype of this new version, known as the Mirage III-001, made its first flight on November 17, 1956 and showed its potential by achieving Mach 1·5 in level flight during the following January. Externally, the Mirage III was not unlike the Mirage I, although it was larger and featured a number of aerodynamic improvements, notably fuselage area ruling. The Mirage III-001's fixed-geometry lateral air intakes were later replaced by adjustable intake "bullets" and the aircraft was re-engined with an Atar 101.G2, of similar thrust output to the original power-plant. The modified proto-



First pre-production aircraft was the Mirage IIIA–01, seen here landing at Istres with external fuel tanks.

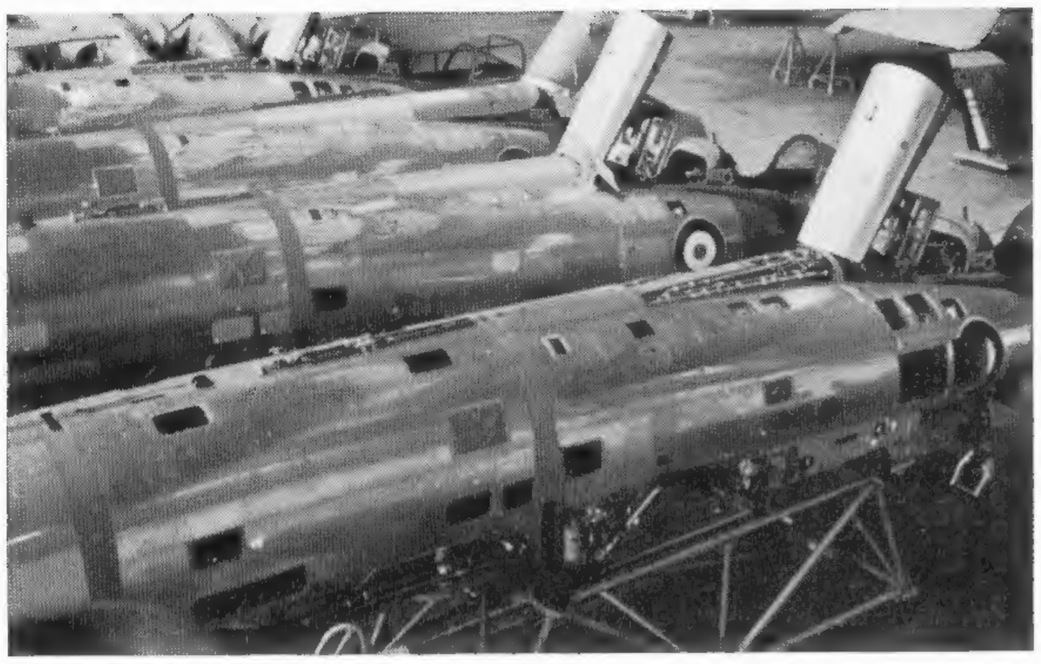
type then attained a speed of Mach 1·8 with the aid of its rocket motor and was capable of Mach 1·65 on its jet engine alone.

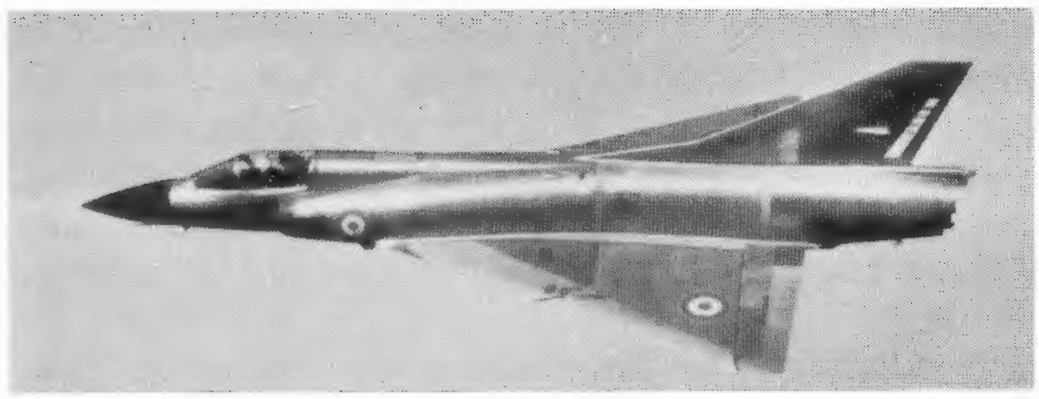
THE PRE-PRODUCTION MIRAGE IIIA

Originally, the Mirage III was intended primarily as an interceptor but it was decided to investigate the type's potential in other roles. Therefore, when the French Air Force ordered 10 pre-production Mirage IIIAs they were viewed not only as normal handling and trials' aircraft but also with development for other roles in mind. The IIIA featured a longer fuselage than the prototype Mirage III and was powered by a SNECMA Atar 09B, rated at 13,225-lbt with reheat. Wing area was increased and the thickness/chord ratio decreased, while leading-edge conical camber (which had been tested on the Mirage III-01 after its re-engining) was incorporated following initial tests of the IIIA.

The first pre-production aircraft, the Mirage IIIA-01, started flight trials on May 12, 1958 and, in October of that year, this aircraft achieved Mach 2 in level flight without the aid of the rocket motor. The IIIA-01 was later used to flight test various under-wing auxiliary fuel tanks. The second aircraft, the IIIA-02, was allocated for initial trials of the SEPR 841 rocket motor, which supplanted the earlier SEPR 66 on the Mirage IIIA. This motor was twin-chambered and offered either 1,500-lbt for 2 minutes 40 seconds or 3,000-lbt for 1 minute 20 seconds. The Mirage IIIA-03 and A-04 were used to

Early flight trials of the Mirage III–001 were followed by detail modifications, including the fitting of variable-position air intake bullets.
(Photo: Ministère des Armées "Air")





The Mirage IIIA–05 was similar to the first production variant, the Mirage IIIC, and featured nose-mounted radar.

Mirage IIICs under construction at Avions Marcel Dassault's Bordeaux factory. (Photo: Informations Aéronautiques)

check out other major systems, while the final six aircraft were substantially similar to the first major production version, the Mirage IIIC.

Once the Mirage IIIC was cleared for service, the IIIAs were used for a variety of development purposes—one became the first Mirage IIIO, powered by a Rolls-Royce Avon engine, this variant being proposed to Australia for the Royal Australian Air Force.

THE MIRAGE III PRODUCTION VARIANTS

A change of tense is called for here, since the Mirage III is a current warplane. There are four basic variations on the theme: interceptor; attack; reconnaissance; and two-seat trainer. However, it should be noted that the interceptor variants have good secondary-role attack capability and vice-versa. The various types of Mirage III, which have been or are still in production are now dealt with in the order of their appearance.

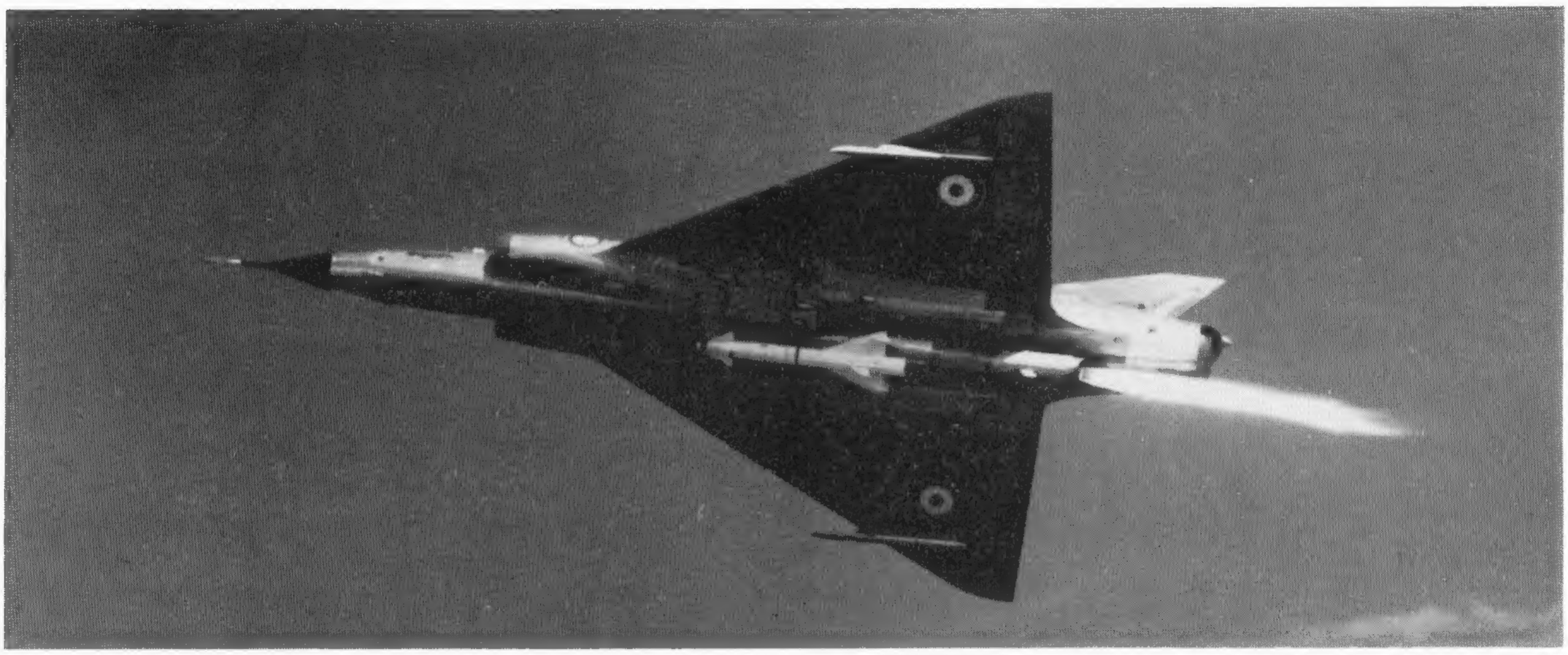
Mirage IIIC: Following successful evaluation of the Mirage IIIA, the French Air Force *(Armée de l'Air)* placed an initial order for 95 Mirage IIIC interceptors, and the first example started flight trials in October 1960. The Mirage IIIC is similar to the IIIA-05 and is powered by a SNECMA Atar 09B3, rated at 13,225-lbt with reheat. A supplementary SEPR 844 rocket motor, rated at 3,700-lbt, can be installed in the rear fuselage in place of one of the internal fuel tanks.

A wide range of external stores or fuel tanks can be carried by the Mirage IIIA, which has a normal internal fuel capacity of 484 Imperial gallons. A pack containing two 30-mm DEFA cannon can be carried in the forward fuselage, but this is replaced by a tank of rocket fuel when the SEPR 844 motor is fitted. Among the external stores available for the IIIC are the Matra R.511 or R.530 air-to-air missiles, Sidewinder air-to-air missiles, the Nord AS.30 air-to-ground missile, two 1,000-lb bombs under the fuselage and two more under the wings, Dassault JL-series rocket and rocket/fuel tank pods under the wings, and napalm tanks. Two underwing fuel tanks of 138, 286 or 374 Imperial gallons capacity each may be carried.

Production of the Mirage IIIC ceased in 1964, although a "souped-up" version, known as the IIIC-2, was built in prototype form. In addition to use by the French Air Force (where it equipped the 2nd, 13th and later, the 5th *Escadres de Chasse*), a considerable number has been exported. Export sales of the Mirage are dealt with in a later section, although it is worth noting that this version was built under licence in Switzerland.

Mirage IIIB: The IIIB two-seat trainer was developed in parallel with the Mirage IIIC and the prototype actually flew before the first production interceptor, on October 21, 1959. The extra tandem seat necessitated a fuselage extension of 23·6 inches. Normally, neither armament nor fire control radar are fitted to the Mirage IIIB, although this can be effected if desired. The French Air Force placed an initial order for 26 IIIBs and over 70

One of the 2e Escadre's Mirage IIICs at the 1964 Italian Air Show (Turin-Caselle Airport). (Photo: Publifoto)



Mirage IIIC of the 2e Escadre de Chasse with its SEPR 844 rocket motor in operation. (Photo: "Flight International")

have been ordered including those for export. One Mirage IIIB was used in the Concorde development programme. The Mirage IIIBE is similar to the IIIB but features equipments installed in the IIIE.

Mirage IIIR: The IIIR is a photo-reconnaissance variant, and the French Air Force initially ordered 50. The first of two prototypes made its first flight on October 31, 1961 and the first production example started flight trials on February 1, 1963. The type serves with the 33rd *Escadre de Reconnaissance* of the French Air Force and, in addition to licence production in Switzerland, has been exported in small numbers.

An improved version, the Mirage IIIRD, features updated navigation and Doppler equipment similar to that carried by the IIIE. The French have ordered 20.

Mirage IIIE: This variant, whose prime role is tactical strike, followed the Mirage IIIC on the Dassault production line. Powered by an Atar 09C3 engine, rated at 13,670-lbt with reheat, the Mirage IIIE has a fuselage 11·8 inches longer than the IIIC's. An SEPR 844 rocket motor can be fitted. The *Cyrano I bis* fire-control system of the Mirage IIIC has been replaced by the *Cyrano II bis* and the IIIE also has (UK) Marconi Doppler equipment and (USA) TACAN. Similar external loads can be carried to those listed for the Mirage IIIC.

The French Air Force placed an initial order for 130 Mirage IIIEs and these went into service with the 2nd, 3rd, 4th, 7th and 13th *Escadres de Chasse*. The first of three prototypes made its first flight on April 5, 1961 and the first production example followed on January 14, 1964. The Mirage IIIE is the most widely exported variant so far and has also been produced under licence in Australia (as the Mirage IIIO). Well over 400 have been ordered in all, including those for home use.

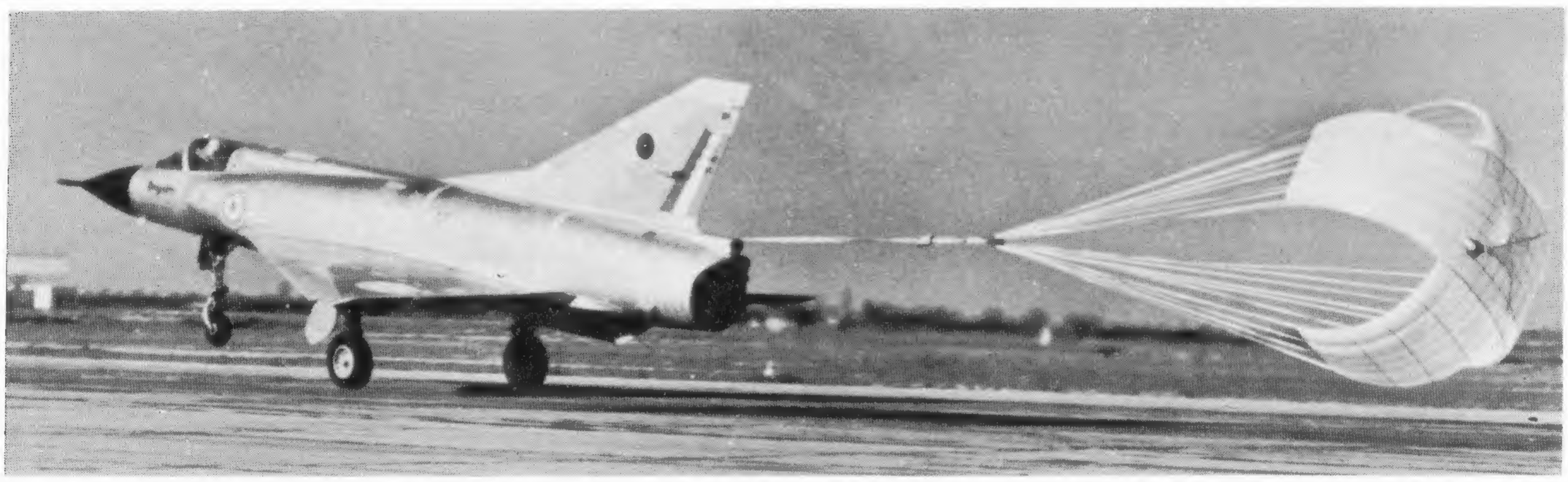
Mirage IIID: This is a two-seat trainer variant of the Mirage IIIE. It is being built under licence in Australia, and Dassault has also exported the type.

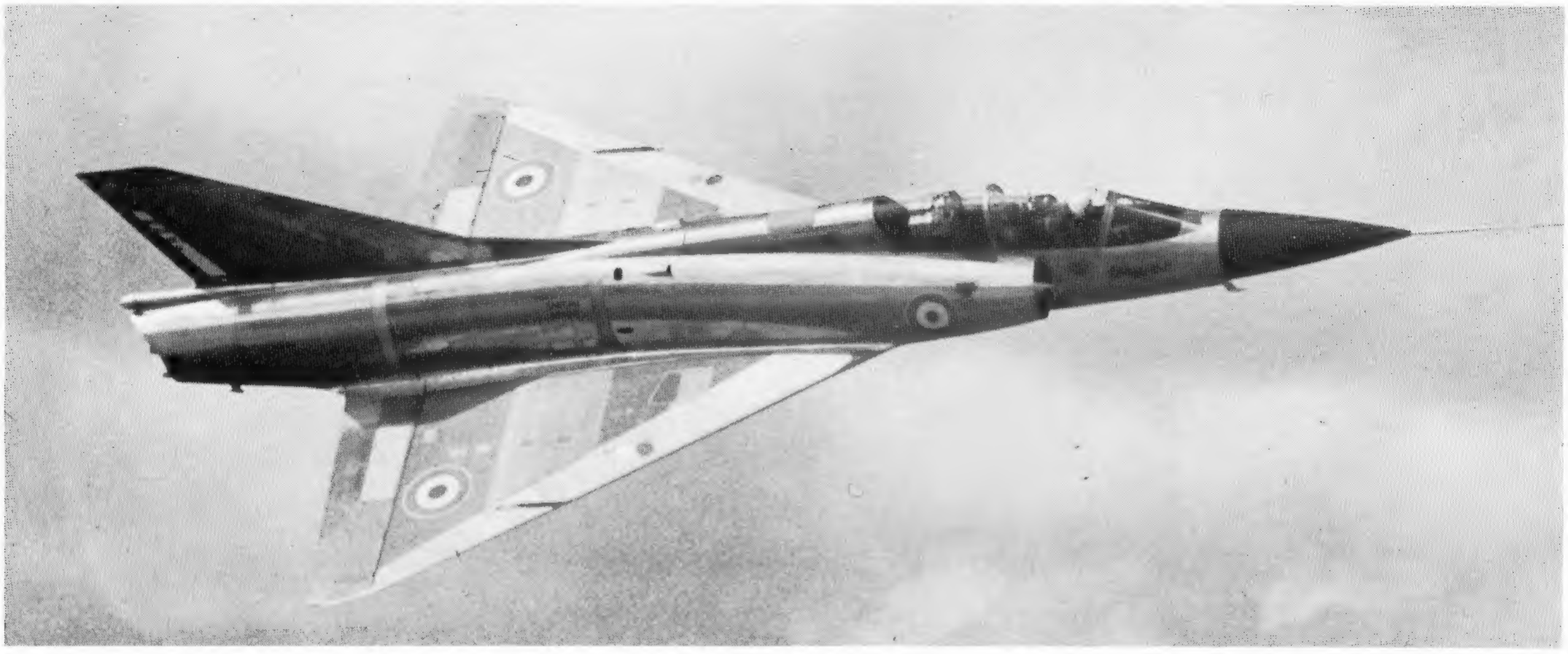
THE MIRAGE 5

Dassault has developed a variant of the Mirage IIIE, aimed at the export market, which does not carry the same advanced avionics equipments—this being not required by some customers. The resulting Mirage 5 retains the IIIE's Mach 2 performance (and ability to operate from poor-quality airfields) while the reduced avionics package has permitted increased load-carrying ability. Thus, an extra 110 Imperial gallons of fuel can be carried internally and up to 8,800-lb of weapons or over 1,000 Imp. gals. of fuel can be carried externally.

The Mirage 5 already has an excellent sales record, although 50 ordered by Israel have been embargoed by the French Government. This variant is being built under licence in Belgium.

Mirage IIIC deploying its braking parachute during the landing run.





The Mirage IIIB–01 two-seat trainer prototype.

THE MILAN

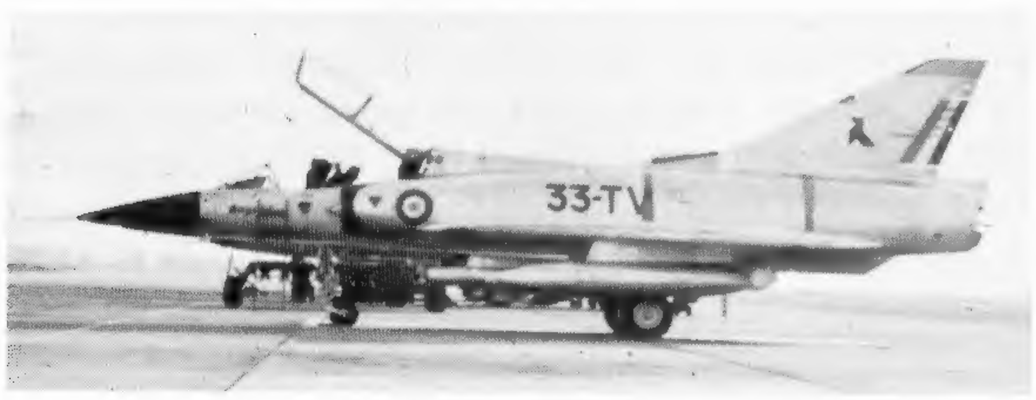
The latest variant of the basic Mirage III/5 family is the Milan (this name does not refer to the Italian city, but to a bird known in English as the "kite"). It is similar to the Mirage IIIE, but is equipped with retractable foreplanes—these being nicknamed "moustaches". This innovation was developed jointly by Dassault and the Federal Aircraft Factory, of Switzerland, and leads to radically improved take-off and low-speed handling characteristics. Each foreplane has a span of 2·6 feet and features fixed leading-edge slats and slotted trailing-edge flaps. The whole installation is extremely light and only takes up a small amount of space forward of the cockpit.

Foreplanes were first tested in a fixed installation on a Mirage III during 1968; then followed a retractable installation on a Mirage IIIR, this aircraft being shown at the Paris Air Show in June 1969. Finally, a definitive prototype, known as the Milan S-01, was converted from a Mirage IIIR and first flown on May 29, 1970. The Milan S is powered by a 15,870-lbt SNECMA 09K-50 and has a greater external load capacity than the Mirage IIIE. It also has improved avionics, including the navigation/attack system developed for the Anglo-French BAC/Breguet Jaguar.

No orders for the Milan had been announced at the time of writing (May 1971) but Dassault has said that deliveries could be started in 1972. Switzerland is being strongly wooed with the type and it is reported that South Africa has been discussing a possible order with the manufacturer.

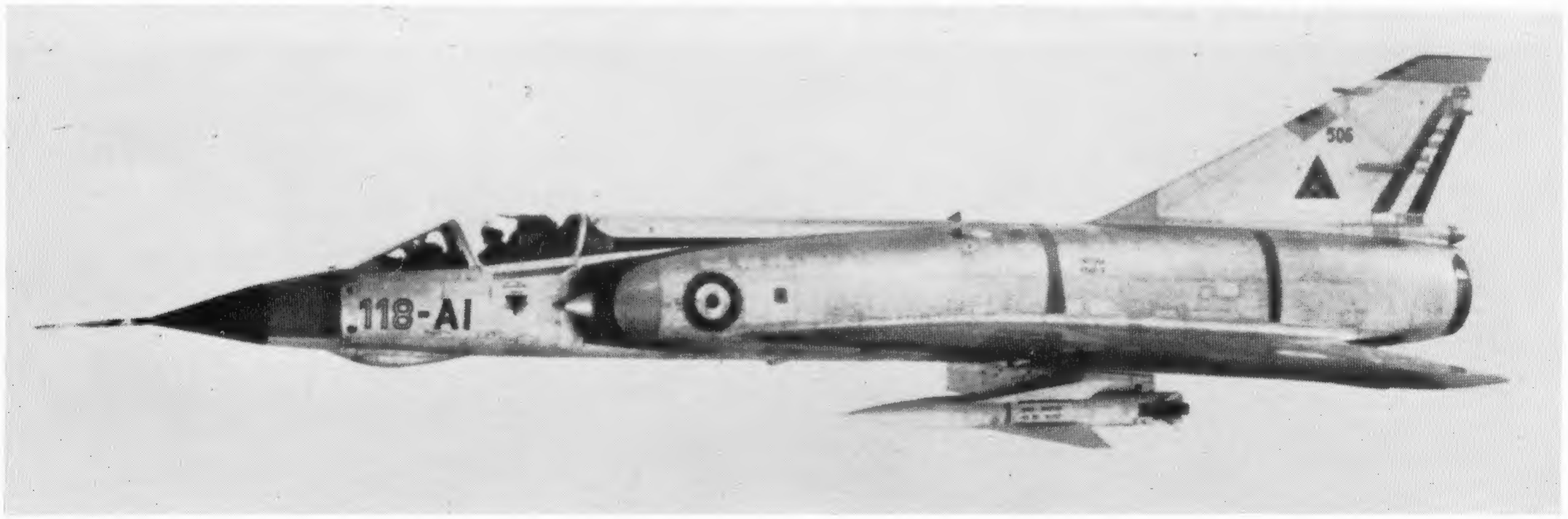
EXPERIMENTAL MIRAGE IIIs

There are three variants of the Mirage III which can best be described as experimental. The first of these was the Mirage IIIT, this being a test-bed for turbofan engines and featuring a rear fuselage of greater diameter

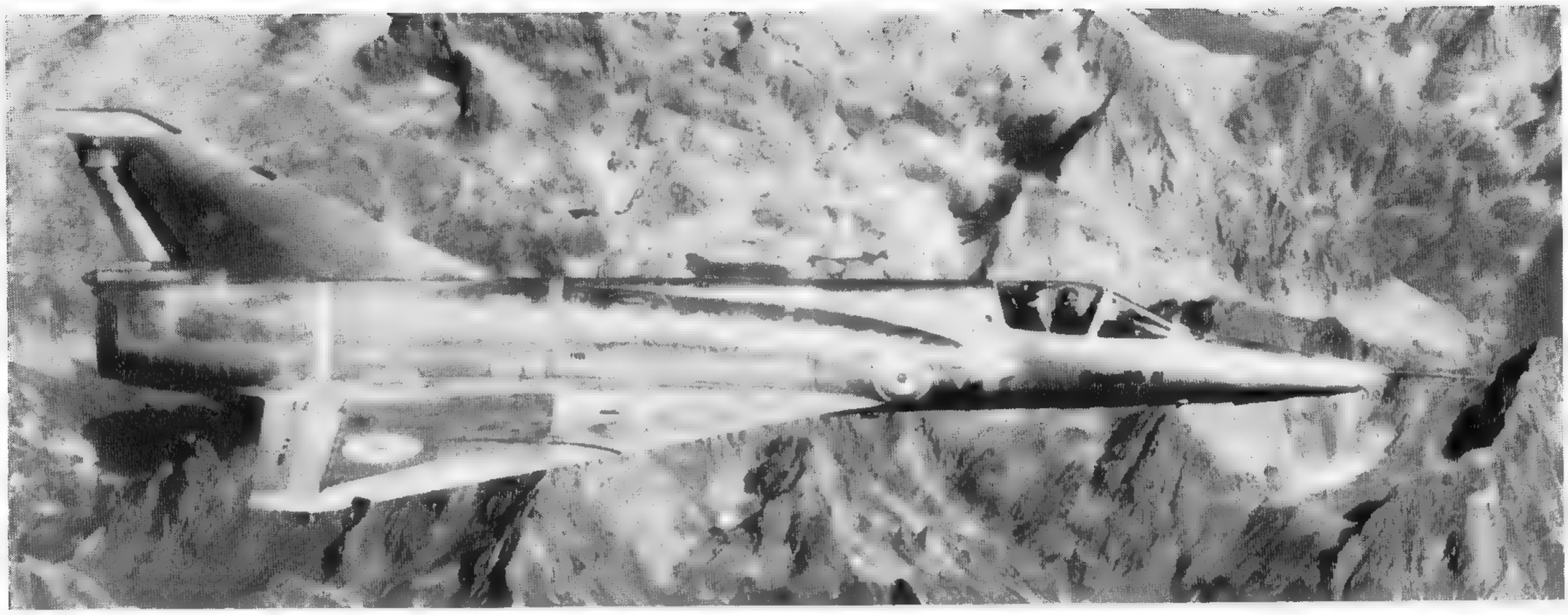


Mirage IIIB of the 33e Escadre de Reconnaissance seen at Dijon-Longvic in October 1963.

(Photo: Air-Britain archives via Charles W. Cain)



Mirage IIIE No. 506 of the Centre d'Expériences Aériennes Militaires (C.E.A.M.), Mont-de-Marsan, carrying a Nord AS 30 missile.



The Mirage IIIR 01 prototype reconnaissance aircraft. (Photo: Ministère des Armées "Air")

A line-up of Mirage IIIRs of the French Air Force's 33e Escadre de Reconnaissance. (Photo: Ministère des Armées "Air")

than the standard production Mirage III. The IIIT was first fitted with a SNECMA TF-104B (based on the Pratt & Whitney JTF10), which had a dry rating of 10,500-lbt. In this form, it first flew on June 4, 1964 and then was grounded for the installation of a SNECMA TF-106. This engine was rated at 19,840-lbt with reheat and was intended for installation in the Mirage IIIV. The Mirage IIIT first flew with the TF-106 on January 25, 1965.

Dassault started work on vertical take-off and landing (VTOL) at the beginning of the 1960s and decided to modify the original Mirage III-001 prototype for VTOL research. The aircraft's Atar 101 was replaced by a 5,000-lbt Bristol-Siddeley Orpheus 3 engine for forward propulsion, while eight 2,200-lbt Rolls-Royce RB.108s provided vertical lift. These lift engines featured retractable intake grilles and the exhausts were covered by fairing doors during normal forward flight.

After tethered hovering trials, the Balzac—as it was renamed—made its first free hovering flight on October 13, 1962 and its first transition on March 18, 1963. Its career was interrupted by a crash landing on January 10, 1964 but it was subsequently repaired and flew again. The Balzac provided Dassault with a great deal of information on stabilization in hovering flight and led to the Mirage IIIV.

Originally conceived within the framework of Nato Basic Military Requirement 3 (NBMR.3), for a low-altitude VTOL strike fighter, the Mirage IIIV continued in development despite the demise of this requirement within a short time of its issue in 1961. With a similar wingspan to the normal Mirage III, the IIIV had, however, an appreciably longer fuselage (59·04 ft).

The first of two prototypes was powered by a SNECMA TF-104B and eight 3,525-lbt Rolls-Royce RB.162s, and first flew at Istres—making a conventional take-off and vertical landing—on March 24, 1966. Plans to fit the TF-106 engine to the IIIV went awry because of problems with this powerplant and the second prototype was fitted with an 18,250-lbt Pratt & Whitney TF30 propulsion engine. This aircraft, which retained the RB.162 lift engines, made its first flight in June 1966. During the course of flight trials, the second prototype (Mirage IIIV-02) achieved Mach 2·04. Later, it crashed on November 28, 1966 and was written-off.

Dassault's enthusiasm for VTOL cooled as a result of this accident—and because of French Air Force uncertainty about the concept—and work on the Mirage IIIV was halted. Should the company decide to go back into this field, however, it has a solid body of experience to draw upon.

THE MIRAGE III/5 ABROAD

Reference has already been made to the export success of the Mirage. A crucial factor in this success has been the full support provided by the French Government—indeed, at times the Government has initiated negotiations with a potential customer and only brought in

Dassault at a later stage. The export total already (March 1971) exceeds 700 aircraft and the manufacturer hopes to increase this to about 1,000 by the mid-1970s. A country-by-country breakdown follows:

Argentina: A comparatively recent customer, Argentina has ordered 12 Mirage IIIEs and two two-seat trainers. Deliveries to the Argentine Air Force *(La Fuerza Aerea Argentina)* are scheduled to begin during 1972.

Australia: This customer evinced interest in the Mirage III at the beginning of the 1960s and originally considered installing the Rolls-Royce Avon which it then planned to build under licence. Dassault converted one of the pre-production Mirage IIIAs to take the Avon 67, rated 16,000-lbt with reheat, and this aircraft made its first flight on February 13, 1961. It was designated Mirage IIIO and, although the Australians eventually decided to use the SNECMA Atar 09C as powerplant for their Mirages, this name was retained.

The Mirage IIIO is basically similar to the IIIE and was built in Australia by the Commonwealth Aircraft Corporation, receiving the company designation CA-29. Commonwealth also manufactured the Atar 09C engine under licence. A two-seat training version, the Mirage IIID, is still in production in Australia.

Dassault supplied two single-seat pattern aircraft and the Australian company produced 98, the first licence-built example starting flight trials on November 16, 1963. Actually, two variants of the Mirage IIIO were produced: the first 48 were the IIIO(F) version, primarily intended for the all-weather interceptor role; and the final 52 were the IIIO(A) version, primarily for attack. Four Royal Australian Air Force (RAAF) squadrons operate the Mirage IIIO—Nos. 3, 75, 76 and 77 squadrons. Deliveries were completed in 1968 and current plans are for the type to serve in front-line units until about 1975–6, although the interceptors are now being converted to ground-attack configuration, with additional limited photographic-reconnaissance capability.

Ten Mirage IIID trainers were originally ordered for the RAAF and delivered between 1966 and 1968, now serving with the Mirage Operational Conversion Unit. Early in 1971, a further six IIIDs were ordered for the RAAF and these should start to enter service early in 1972.

Belgium: The Belgium Air Force *(La Force Aérienne Belge)* selected the Mirage 5 to replace its ageing Republic F-84F Thunderstreak and RF-84F Thunderflash aircraft and, at the same time, Dassault brought the Belgian aircraft industry into its team of sub-contractors. The French company has taken a substantial financial holding in SABCA, which not only produces components and assembles the Mirage 5 in Belgium but also does work on other Dassault projects. The Fairey S.A. of Gosselies is another company producing components for Belgian-built Mirage 5s.

All told, 106 Mirage 5s are on order for the Belgian Air Force, and deliveries are now getting underway. To replace the F-84F, 63 Mirage 5BA ground attack aircraft are being procured; this variant is similar to the basic Mirage 5 but features a more sophisticated attack system. Twenty-seven Mirage 5BR photo-reconnaissance aircraft are on order to replace the RF-84F, these being able to carry five Vinten cameras in a nose similar to that

Key to colour illustrations

1 **2–LE : No. 17**—Mirage IIIC of the French Armée de l'Air. Period, 1968. Unit emblem on fin is Alsace coat-of-arms of 3e Escadre de Chasse (Escadron III/2 "Alsace") at BA–102, Dijon-Longvic.

2 **409**—Mirage IIICJ of Israel's Zva-Ha'Hagana Le'Israel/Chel Ha'Avir or Israel Defence Force/Air Force. Period, 1963.

3 **802 : L**—Mirage IIICZ of the Suid-Afrikaanse Lugmag or South African Air Force. Period, 1964. Allocated to Waterkloof-based No. 2 (Cheetah) Squadron, S.A.A.F.

4 **2–FI : No. 209**—Mirage IIIB of French Air Force's 2e Escadre de Chasse (Escadron II/2 "Côte d'Or") at BA–102, Dijon. Period, 1968. "La Mouchette" (Sea-gull) fin marking dates from a World War One unit.

5 **33–TF : No. 310**—Mirage IIIR of French 33e Escadre de Reconnaissance. Period, 1965. Another World War One unit emblem, a stylized "Cocotte" or child's paper "hen".

The Mirage IIIT–01 engine test-bed.

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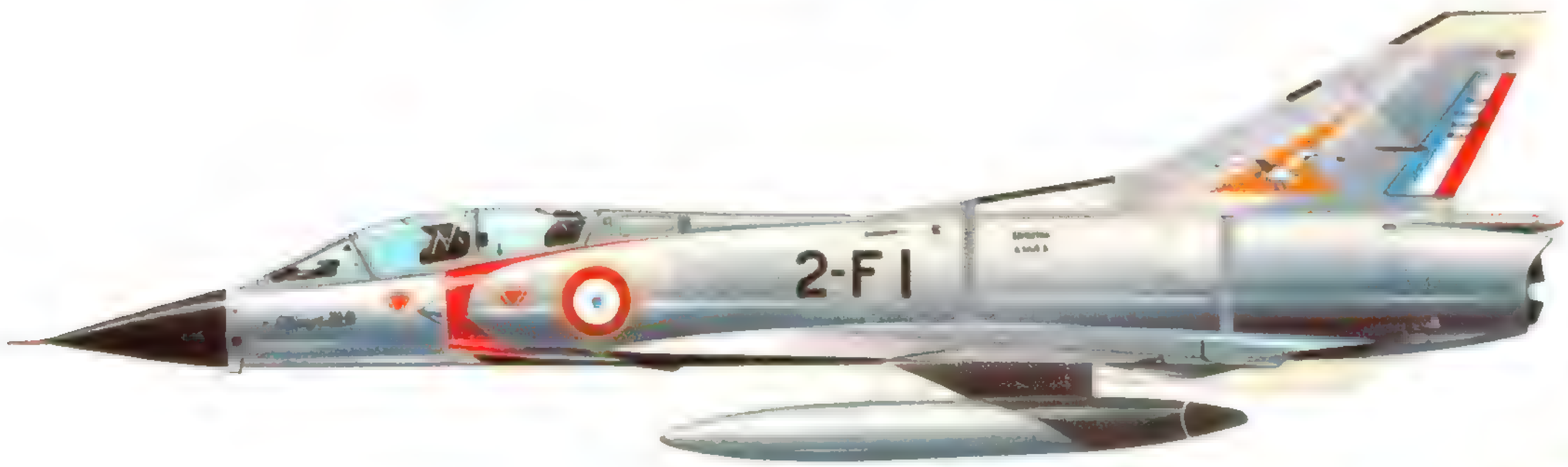

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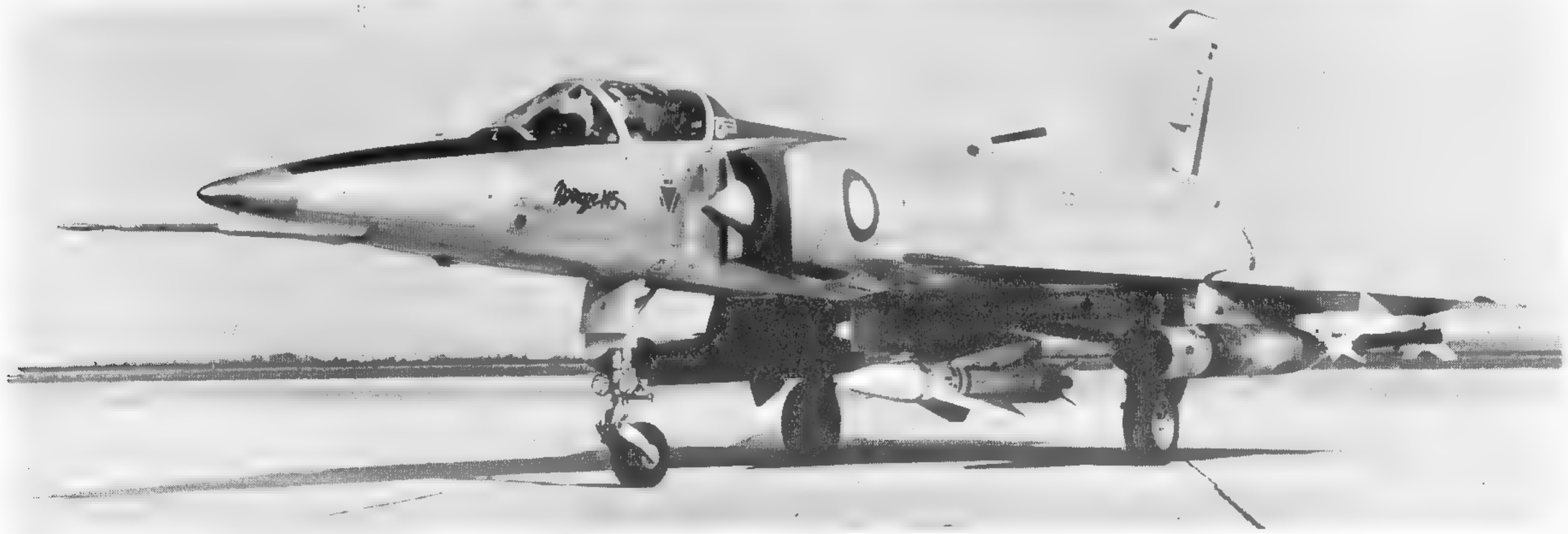
View of the Balzac (upper) and Mirage IIIV–01 (lower) experimental VTOL aircraft in hovering flight.

One of the pre-production Mirage IIIAs was converted to take a Rolls-Royce Avon engine when the Royal Australian Air Force expressed interest in using this powerplant on its Mirages. In the event R.A.A.F. Mirages have Atar engines.

Mirage 5 development aircraft carrying an Nord AS 30 missile under the centre-section and two Dassault JL 100 combined fuel tank/rocket launchers and two Sidewinder missiles under the wings.



of the Mirage IIIR. For conversion and training, the Belgian Air Force has ordered 16 Mirage 5BD two-seat trainers.

Brazil: The Brazilian Air Force *(La Forca Aerea Brasileira)* has ordered 12 Mirage IIIE single-seaters and four Mirage IIIB two-seaters. Deliveries will be made in 1972.

Colombia: Another recent customer, Colombia *(La Fuerza Aerea Colombiana)* has ordered 18 Mirages to be delivered from 1972. This total is reported to break down as follows: 14 Mirage 5s, two Mirage IIIB trainers and two Mirage IIIR reconnaissance aircraft.

Israel: The Israeli Air Force, officially the Israel Defence Force/Air Force or IDF/AF, is the most famous of foreign customers for the Mirage, and it is chiefly on this service's exploits with the type that its fame rests. Israel initially ordered 26 Mirage IIICs early in the 1960s, although this total was subsequently raised to 72. The first squadron converted to the type in May 1963 and, during the next three years, a further two squadrons were equipped with the Mirage IIICJ (this being its full designation). In addition, three Mirage IIIBJ two-seat trainers were acquired.

Precise details of the Mirage's service with the IDF/AF are classified (information on units and operational service) and the veracity of such items as have been published is difficult to establish. However, it has been reported that only two or three of the IDF/AF's Mirage IIICJs were written-off during the Six-Day War in June 1967.

For several years, the relationship between the French and the Israelis was extremely good. In addition to being good customers, the IDF/AF fed a stream of information to both Dassault and the French Air Force on the Mirage's performance in a realistic operational environment. However, relations deteriorated after the Six-Day War and officially at least, do not appear to exist at all.

First, and most serious for the Israelis, the French Government embargoed delivery of 50 Mirage 5s ordered prior to the 1967 war. Production of the order went ahead at Dassault, in anticipation of an early lifting of the embargo. This has, however, not so far happened and after efforts by the French Government to terminate the contract—without success—the aircraft were placed in long-term storage in France. The French Government actually offered the Israelis their money back but they declined to accept, fearing that the Mirages might then be delivered to an unfriendly power.

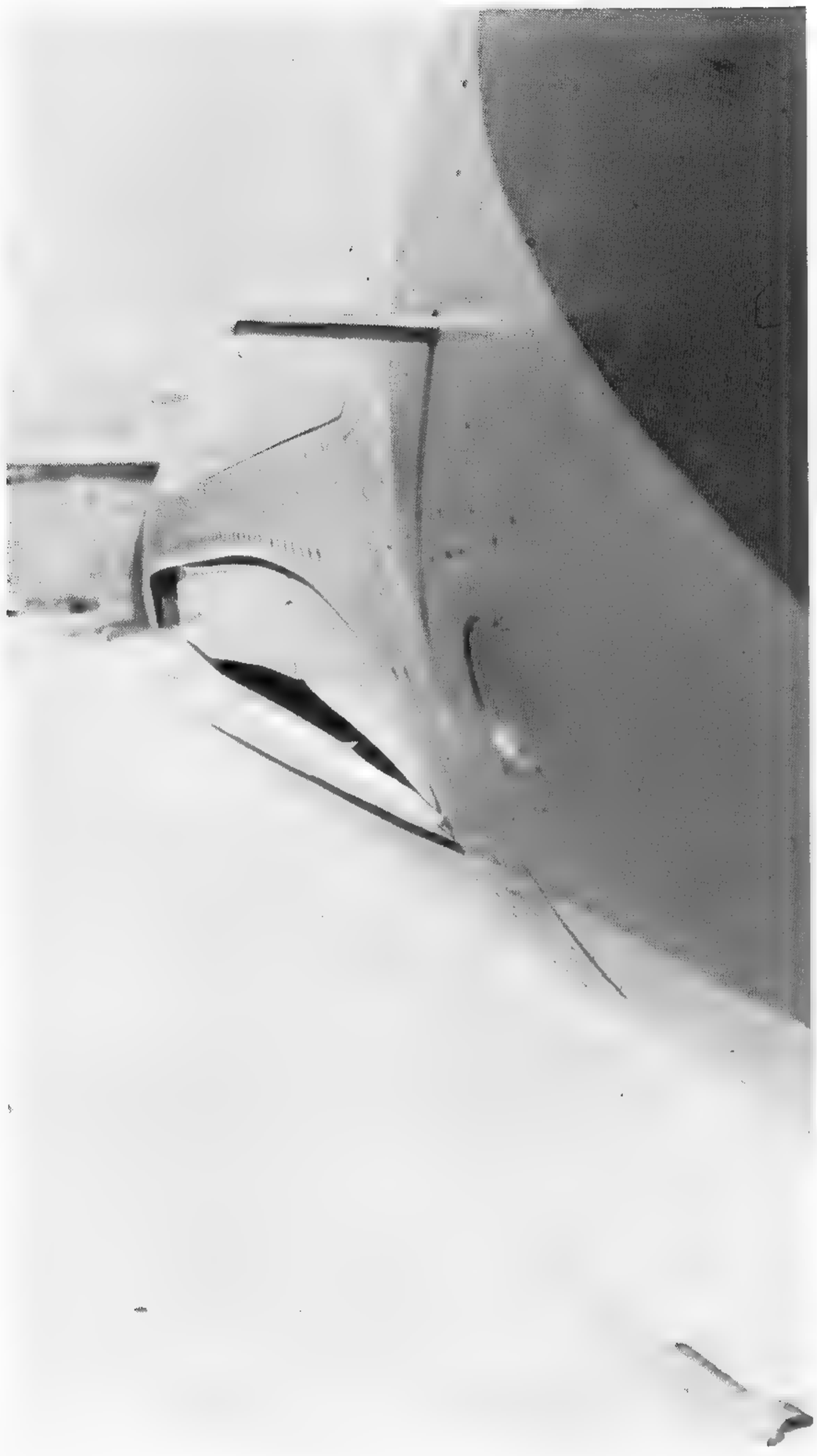
The supply of spares for the Mirage IIICJs has been permitted but it appears that Israel is developing the means to produce its own spares. It is known that the Israelis possess drawings for the Mirage and its Atar powerplant and Israel Aircraft Industries has the technical capability to use them. However, the subject is not open for discussion in Israel.

Persistent unconfirmed reports suggest that Israel has

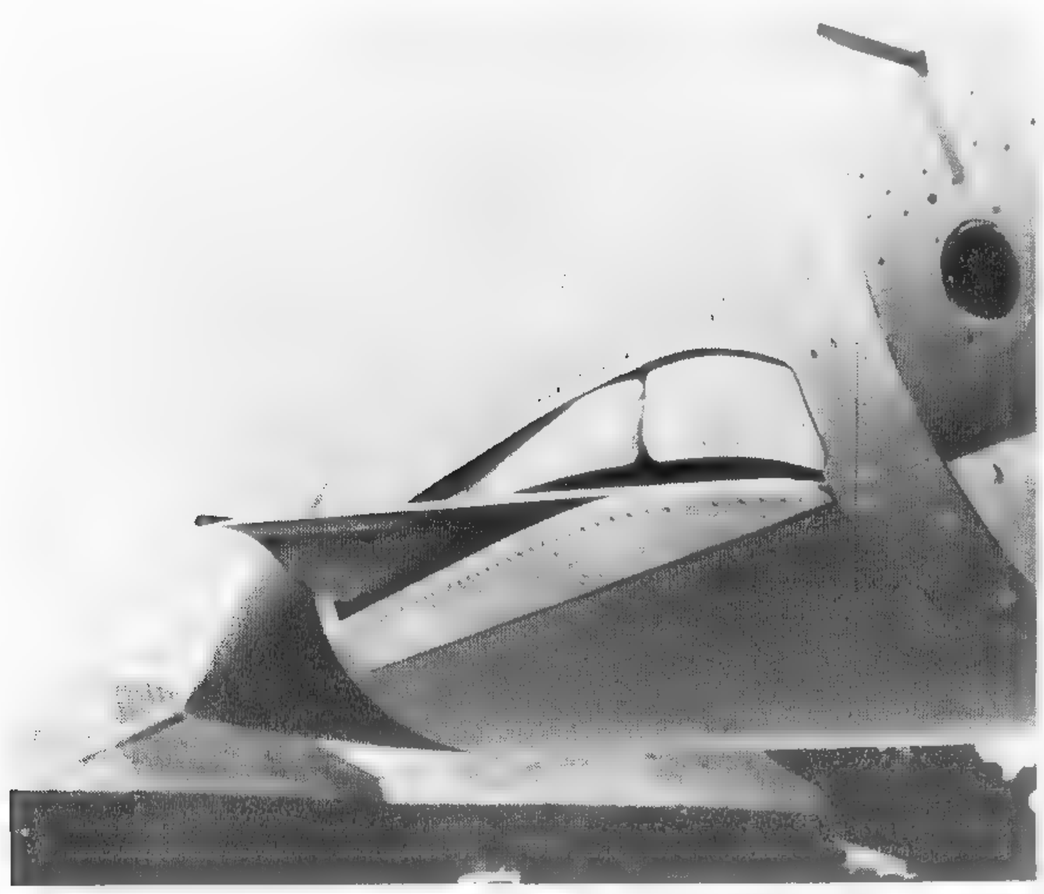
The first Milan development aircraft, with fixed foreplanes.

A3-74, an Australian G.A.F.-C.A.C. licence-built Dassault Mirage IIIO(A) with two 100-gal. drop tanks and 131-gal. rear ventral tank. Allocated to No. 3 Squadron, R.A.A.F., at S.E.A.T.O. base, Butterworth, Malaysia, 1970.

P. Endsleigh Castle, AFRAeS



Sequence showing deployment of the retractable foreplanes fitted to a Mirage IIIR.



been experimenting with a new powerplant for its Mirages. One Mirage has apparently been re-engined and test flown with the 17,200-lbt General Electric J79. In this form, it is said to be known in Israel as the "Super Mirage" or "Salvo"; and, perhaps all surviving IDF/AF Mirage IIIs may be equipped with the J79 engine, if the experiment proves to be a success. There is no problem about obtaining J79s from the USA—if needs be, under the guise of spares for the IDF/AF's McDonnell Douglas F-4 Phantoms.

It will not be possible to tell the full story of the Israeli Mirages for many years yet—if ever—but their place in aviation combat history is assured.

Lebanon: The story of the Lebanese Mirages is less spectacular but does have an interesting twist. The Lebanese Air Force *(La Force Aérienne Libanaise)* has acquired 12 Mirage IIIEs and two IIIB two-seat trainers. The single-seat IIIELs are chiefly intended for interception and do not have the advanced navigation system fitted to French IIIEs. It seems that the Lebanese now doubt the wisdom of buying such advanced aircraft, finding it difficult to keep them operational, and it is said that the Lebanese Air Force would prefer to employ surface-to-air missiles for air defence. It is known that the Lebanese Government has approached the French

The Milan S-01 seen carrying two Sidewinder missiles, two 500-litre (110 Imperial gallon) auxiliary fuel tanks, and eight 250-lb. bombs—these latter attached to the fuel tanks. This is not the Milan's maximum load: it could also carry another two 250-lb. bombs under the centre section.

about trading in its Mirages for missiles, the latter being more economical in skilled manpower.

The "interesting twist" concerns a little-publicized attempt by Soviet Military Intelligence to acquire an airworthy Mirage for evaluation. A Lebanese Air Force pilot was approached with the aim of bribing him to fly his Mirage to the Soviet Union. The pilot in question alerted Lebanese counter-espionage agents and the plot was nipped in bud. For various reasons, the ensuing diplomatic protests were kept quiet.

Libya: The most newsworthy Mirage sale of recent times has been Libya's order for 110 aircraft. The first question which springs to mind is: What will such a country do with all these modern jets? It has a known shortage of jet-qualified pilots. At the time of the sale, shortly after the overthrow of the Libyan monarchy, the Libyan Air Force had less than a score of pilots checked-out on single-seat jet fighters (Northrop F-5 Freedom Fighters) and it has been conjectured that some of its Mirages might eventually find their way to a third country*. However, the transfer of Mirages to another Arab country seems rather unlikely at present—not least because most other Arab states which consider themselves at war with Israel benefit from substantial Soviet aid and can get enough modern jets to fulfil their requirements.

The Libyan order reportedly covers 30 Mirage IIIEs, 20 IIIRs, 50 Mirage 5s and 10 two-seaters. The French Air Force has made some Mirage IIIBs available for initial conversion training pending the delivery of Libya's own two-seaters. Deliveries are scheduled to be completed in 1974, but should any Libyan Mirages find their way to a third country, France has said that it will embargo future deliveries.

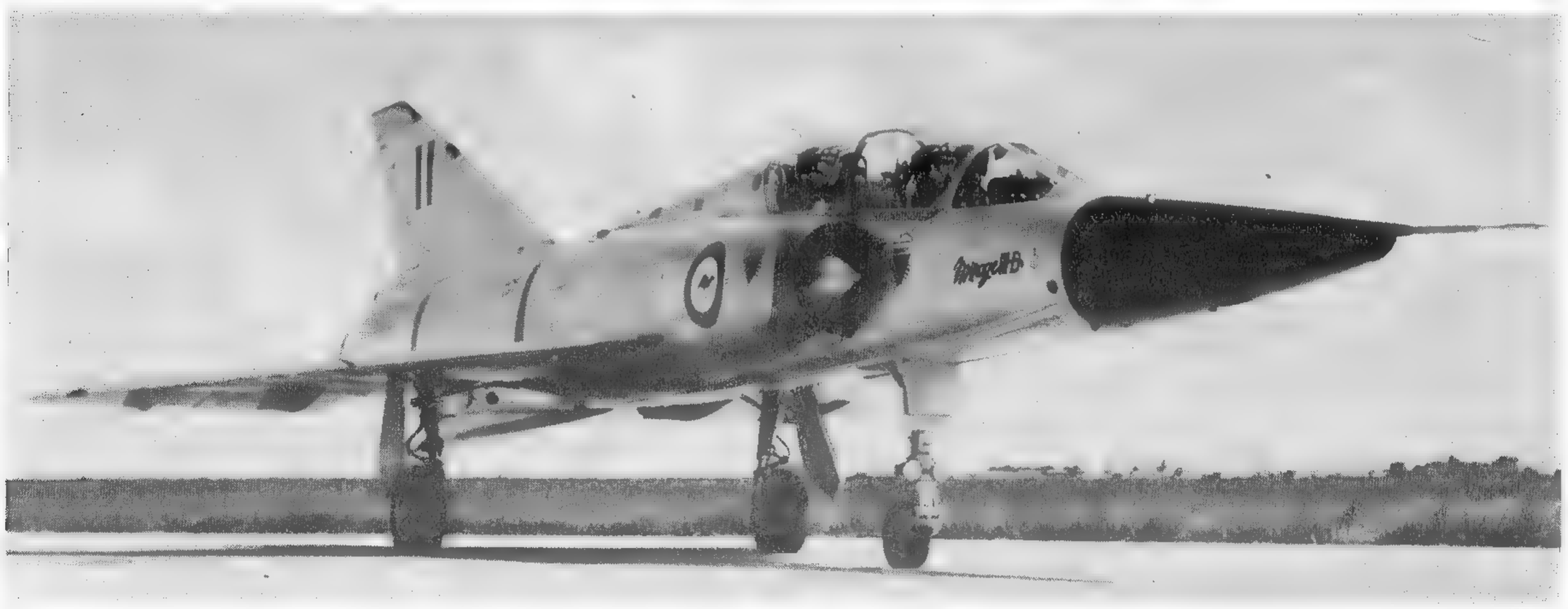
Malaysia: On June 8, 1971, the Malaysian Government announced its plan to purchase enough Mirage 5s to equip a squadron of the Royal Malaysian Air Force.

Pakistan: Twenty-four Mirage IIIs have been supplied to the Pakistan Air Force: 18 IIIEP fighters, three IIIRP reconnaissance variants, and three IIIDP two-seat trainers. Deliveries, which began in 1968 are now completed: the Mirage IIIEs serve with the PAF's No. 5 Squadron.

Pakistan has more recently ordered 28 Mirage 5s for delivery in 1972 plus two two-seat trainers.

* The planned federation of Libya, Syria and the United Arab Republic (Egypt) may also have an effect.

An Australian Mirage IIID. Note the strake under the forward fuselage.



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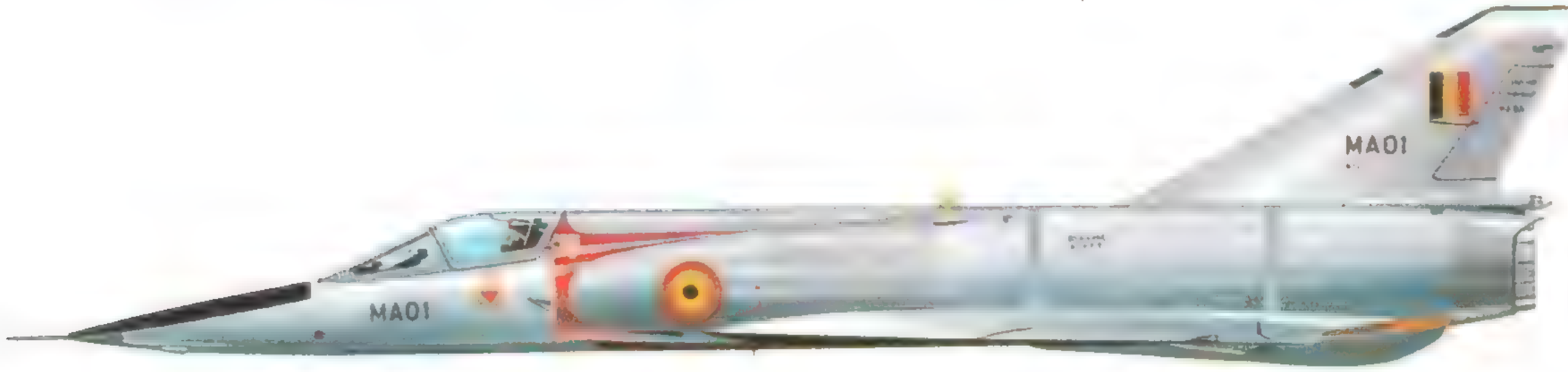


Key to colour illustrations

6 **109**—Mirage IIIEP of the Pakistan Air Force; full serial is 67–109. Period, 1968.

7 **118–A1 : No. 506**—Mirage IIIE of French Armée de l'Air; armed with the radio-command-guidance Nord AS 30 air-to-ground missile which weighs 1,100 pounds.

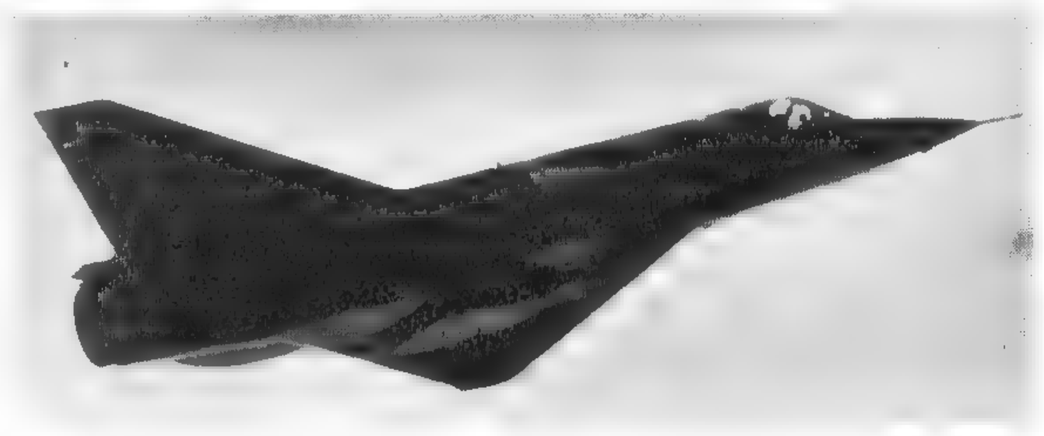
8 **101–02 : C8–2**—Mirage IIIEE of the Ejercito del Aire or Spanish Air Force. Period, 1970. This is the second Mirage IIIEE which has the Spanish military designation C.8.

9 **183**—Mirage 5P of La Fuerza Aerea del Peru or Peruvian Air Force. Period, 1969.

10 **MA 01 : No. 1**—Mirage 5BA of La Force Aérienne Belge or Belgian Air Force. Period, 1970.

The first Mirage IIIO for the R.A.A.F.; this was one of two aircraft built by Dassault. The other 98 were built by the Government Aircraft Factories and Commonwealth Aircraft Corporation.

The Belgian Air Force's second Mirage 5BA (BA 02) in flight.



Peru: The Peruvian Air Force *(La Fuerza Aerea del Peru)* has taken delivery of 12 Mirage 5Ps and two Mirage 5DP two-seaters to serve its air defence needs.

South Africa: One of the earliest customers for the Mirage was South Africa, which initially ordered 16 IIICs for low-level strike duties. These aircraft serve with No. 2 Squadron of the South African Air Force and can carry the Nord AS.20 air-to-ground missile. Three Mirage IIIBZ trainers were also ordered.

Subsequently, 16 Mirage IIIEs were ordered, these now serving with the SAAF's No. 3 Squadron; the service also has three Mirage IIID two-seaters for training on the IIIE variant. Four Mirage IIIR/IIIRD aircraft have been bought for photo-reconnaissance duties.

South Africa is now finalizing a licence-production agreement for the Mirage III (or 5) and Mirage F1.

Spain: As part of its modernisation scheme, the Spanish Air Force *(Ejercito del Aire)* ordered 30 Mirage IIIs early in 1970 and current deliveries will be completed in 1972. The contract covers 26 IIIEEs and four two-seaters, although, to hasten initial conversion training, the French Air Force loaned five Mirage IIIBs. Further orders for the Mirage from Spain are very likely in due course.

An offset agreement in connection with this purchase has brought CASA, the Spanish aircraft manufacturer, Construcciones Aeronauticas S.A., into the list of Mirage sub-contractors. This company, which is also taking part in the Dassault Mercure airliner programme, now produces a number of fuselage sub-assemblies for all Mirage IIIs.

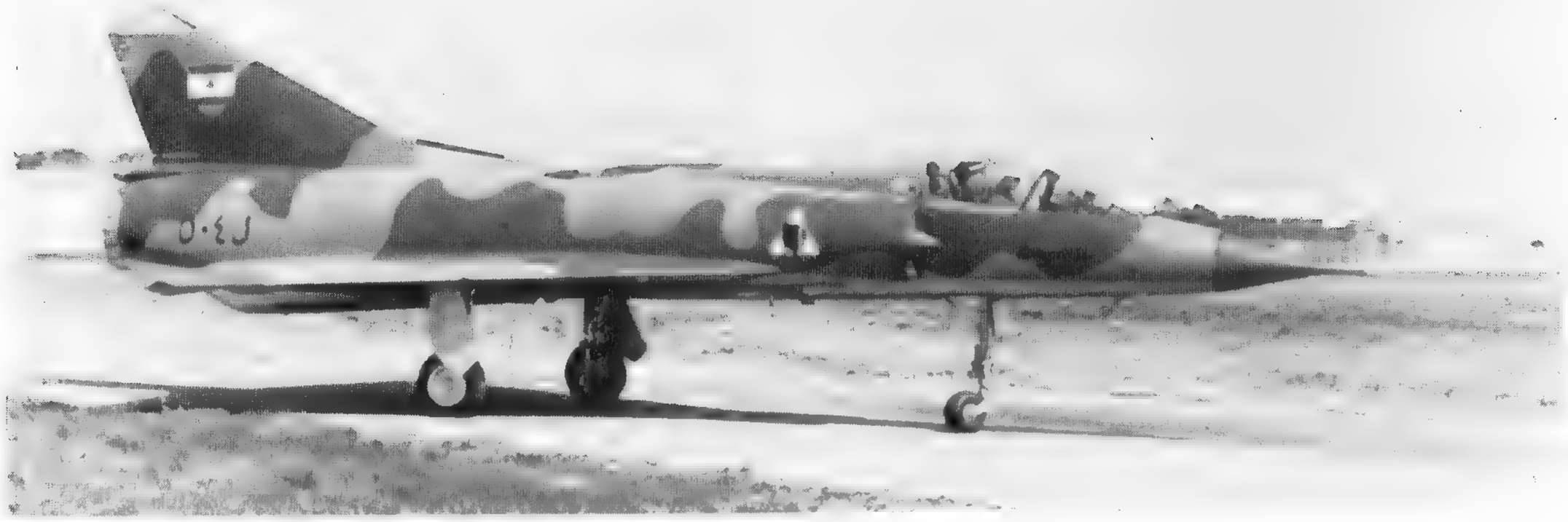
Switzerland: Swiss experience with the Mirage has not been entirely happy. The Swiss Government evinced interest in the Mirage IIIC early in its career and planned to manufacture 100 under licence as the Mirage IIIS. The idea was originally to use the one version for attack, interception and reconnaissance—the latter mission being carried out with underwing and under-fuselage pods containing the necessary equipment.

The order was placed in 1961 but, before long it was evident that Swiss cost estimates were far too low (the uncertainty being brought about by the incorporation of certain special features for the Swiss Air Force). Worse still, the Air Force was forced to accept the fact that the Mirage IIIS would not be suitable for reconnaissance missions because the equipment pods would seriously reduce its supersonic performance when fitted.

The major differences between the Mirage IIIS and the basic IIIC include: replacement of the *Cyrano I bis* fire-control system by the Hughes Taran (the IIIS can be equipped with Hughes missiles); the fuselage nose is hinged forward of the cockpit to allow the aircraft to be stored in the Swiss Air Force's underground hangars; strengthening of the airframe to permit rocket-assisted take-offs and arrested landings; more powerful brakes and reinforced undercarriage. As can be seen, the changes are fairly extensive and they accounted for some of the cost escalation.

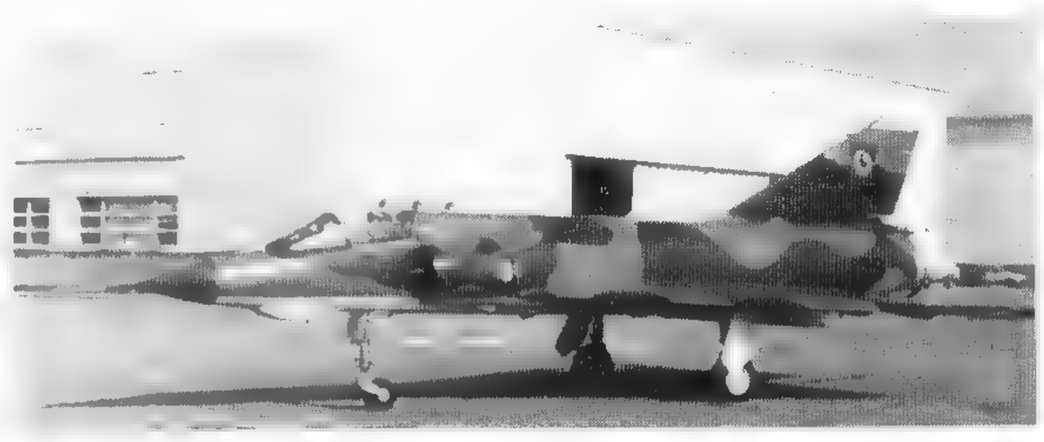
However, the chief causes of rising costs were the need to procure the Mirage IIIR for photo-reconnaissance

A formation of Israeli Mirage IIICJs of the I.D.F./A.F. flies over Jerusalem after the Six-Day War. (Photo: via the author)



One of the Lebanese Mirage IIIEL single-seaters.

*Mirage IIIE (2-LG: No. 423) of French 2e Escadre de Chasse (Escadron III/2 "Alsace") with Cyrano II*bis *radar bulge and Matra R 530 air-to-air missile in September 1968.* (Photo: via Air-Britain archives)



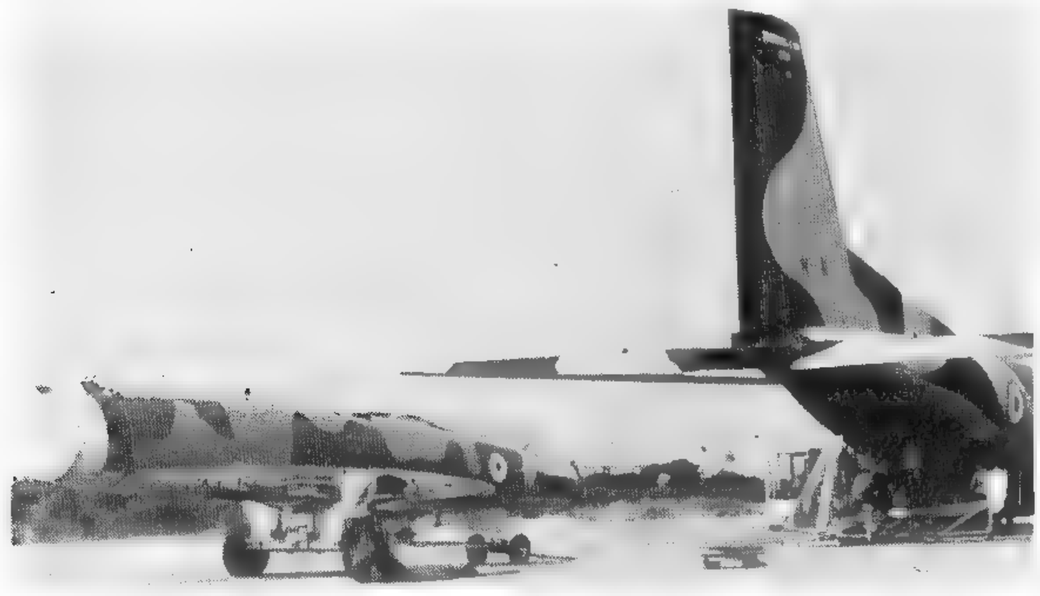
Two Mirage IIIEPs for Pakistan at Bordeaux prior to delivery.

duties and the differences between the IIIS and the IIIRS (as the Swiss-built reconnaissance version is designated). The end result of the trouble was that the Swiss Air Force was able to procure a good deal less than the 100 aircraft originally planned. Only 36 Mirage IIIS fighters and 18 IIIRS reconnaissance aircraft were actually built by the Federal Aircraft Factory, at Emmen in Switzerland. (The Atar 09C engine was also produced in Switzerland.) Dassault supplied a single Mirage IIIC "pattern" aircraft and two Mirage IIIBS two-seat trainers. One of the trainers subsequently crashed and a third was ordered from France.

The Mirage IIIS entered service in 1967, equipping the Swiss Air Force's *Fliegerstaffeln* 16 and 17, while the IIIRS entered service with *Fliegerstaffel* 10 during 1969.

The Mirage cost escalation caused a considerable scandal in Switzerland and, rightly or wrongly, prejudiced some of the Swiss against Dassault. Such evidence as has been published indicates that the blame for the poor costing lies with the Swiss Air Force. Dassault is attempting to sell the Milan to Switzerland to fulfil the country's requirement for a new attack aircraft, despite the prejudice.

Mirage 5P (183) being loaded aboard a French Transall C. 160 (A 06) freighter of Co. T.A.M. (Military Air Transport Command, Armée de l'Air) for shipment to Peru.

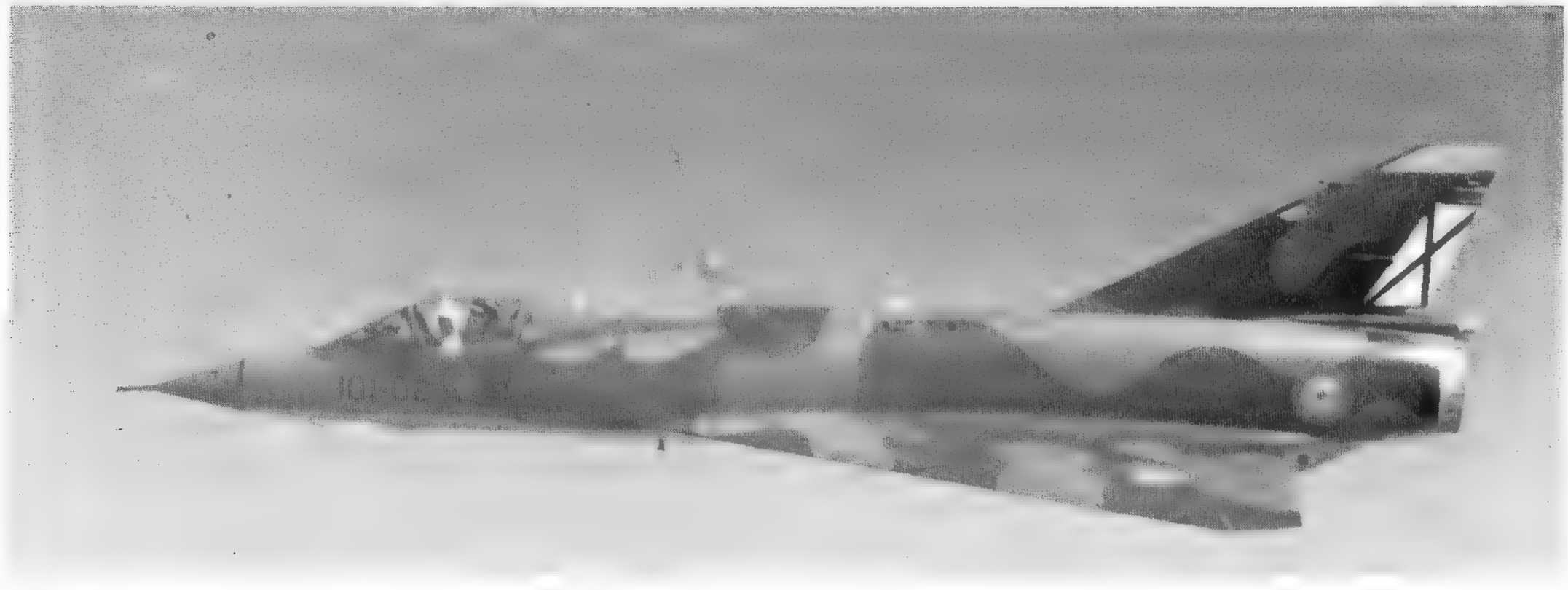


THE MIRAGE IV BOMBER

The designation Mirage IV has already been mentioned as a projected heavy fighter of 1955. This was not developed but the designation was retained for Dassault's entry for a specification issued in 1956 calling for a bomber capable of carrying the French-developed A-bomb. The Mirage IV, basically a scaled-up, twin-engined Mirage III, won the competition and a prototype was ordered. The prototype, the Mirage IV-01, was powered by two SNECMA Atar 09B engines (rated at 13,225-lbt with re-heat) and made its first flight on June 17, 1959. During the flight trials programme—in which period the aircraft exceeded Mach 1·9—the overall height of the vertical fin and rudder was reduced.

The Mirage IV-01 was lost in an accident, but was succeeded by three pre-production aircraft. These, and subsequent production aircraft, were slightly larger than the prototype and were designated Mirage IVAs. The second and third prototypes (-02 and -03) were fitted with Atar 09C engines rated at 14,110-lbt with reheat. The IVA-02 was used for bombing trials and the IVA-03 for development of the navigation system and flight-refuelling procedures. The final pre-production aircraft, the Mirage IVA-04, first flew on January 23, 1963 and was up to production standards, being powered by 14,770-lbt Atar 09K engines.

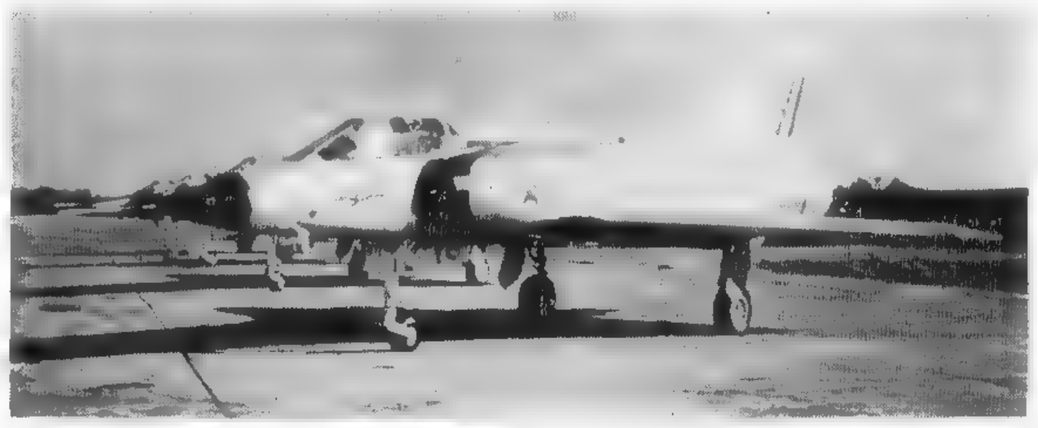
Production Mirage IVAs are fitted with Atar 09K or 09D (14,990-lbt with reheat) engines and deliveries began in 1963. Initially, 50 were ordered and a further 12 followed later—these being complemented by a dozen



The second Mirage IIIEE for Spain.

This Peruvian Mirage 5DP two-seater shows the port fuselage strake very clearly.

One of the Mirage IIICZ single-seaters of the South African Air Force.



Boeing C-135F Stratotankers*, which provide inflight refuelling capability. Three *Escadres* of the French Air Force (the 91st, 93rd and 94th) operate the Mirage IVA and they will constitute the airborne portion of France's "*force de frappe*" until well into the 1970s.

A development of the design was projected by Dassault, the Super Mirage IV powered by two SNECMA TF-106 engines, but it was never built. The Mirage IVA will remain in service until at least 1977–8; if it is to be replaced by another aircraft type—a variant of the Mirage G series seems the most likely choice.

THE MIRAGE F SERIES

The Dassault development policy can best be summed up in the phrase: "Never build an all-new aircraft". Stepwise progress is the key and this is best demonstrated by the Mirage F and G series, which were originally known as the Mirage IIIF and IIIG respectively. The F series features a fuselage design based on that of the Mirage III married to a new high-set swept wing and low-set tailplane. Three variations on the theme were projected: the Mirage F1 single-seat fighter; the F2 two-seat long-range fighter; and the F3 another single-seater but with more airborne equipment and (thus) heavier than the F1.

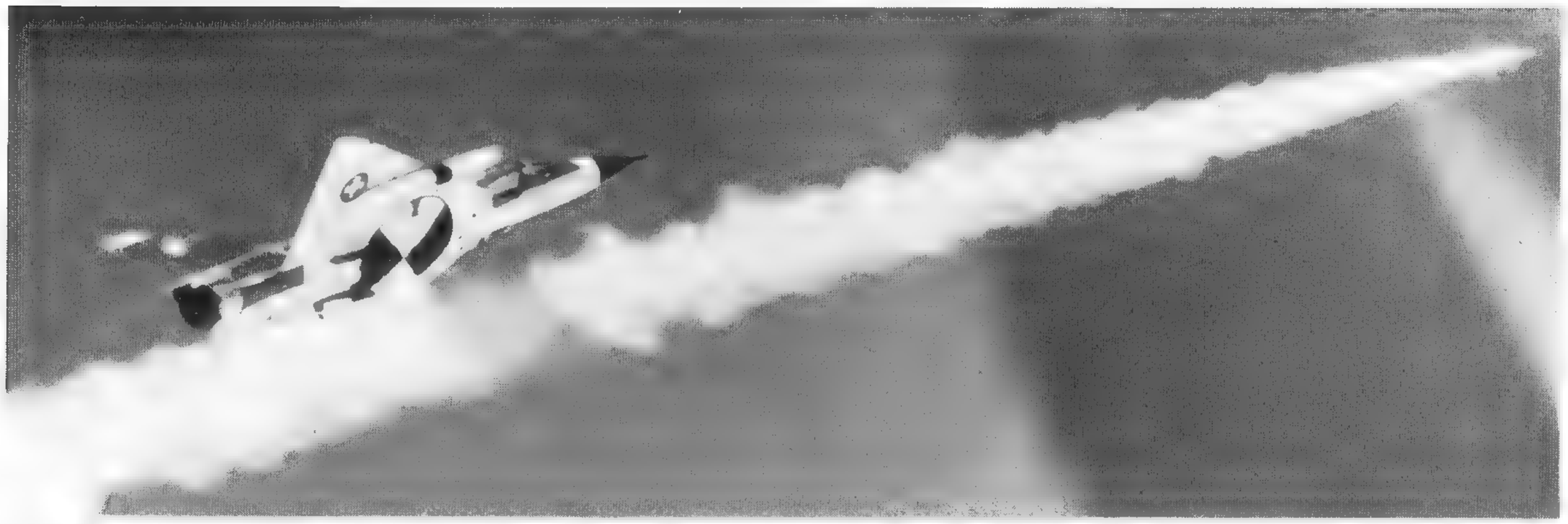
The first variant of the new range to be flight-tested was the two-seat Mirage F2, which was powered by a SNECMA TF-306 engine, rated at 19,900-lbt with reheat. The prototype first flew on June 12, 1966 and by the end of that year it had exceeded Mach 2 in level flight. Span is 34·46-ft, length 57·75-ft, empty weight 20,940-lb, maximum take-off weight 39,680-lb, maximum speed Mach 2·2, and service ceiling 65,600-ft. The Mirage F2 has not been put into production—so far—and the F3 variant has remained a project, but the F1 has been selected to replace the Mirage III in the French Air Force.

The Mirage F1 is smaller than the F2, the wing design being scaled-down from that of the F2 two-seater. It is intended as an interceptor/ground-attack aircraft with even simpler maintenance than that of the Mirage III and certain detail improvements, such as twin-wheeled undercarriage units to permit operation from poor and damaged runways. The first prototype, the Mirage F1–01, was powered by an Atar 09K engine and first flew on December 23, 1966, exceeding Mach 2 during its fourth flight on January 7, 1967. This aircraft crashed on May 18, 1967, but had demonstrated enough potential for the French Air Force to select this variant for production.

Three pre-production aircraft were ordered, plus a static test airframe, and plans were put in hand for an initial batch of 35 production examples. The first pre-production aircraft, the Mirage F1-02, started flight trials on March 20, 1969 and achieved Mach 1·15 on this flight. Initially, an Atar 09K-31 rated at 14,770-lbt with reheat, was fitted but in mid-1969 the F1-02 was re-engined with an Atar 09K-50. This engine, rated at 15,870-lbt with reheat, has been specified for production aircraft.

The first order, for 35 aircraft, was confirmed in May 1969 and this is being followed by a second for 70 more. Dassault has projected variants paralleling the different versions of the Mirage III, although only the interceptor/

* For readers of Profile No. 192 on the Boeing 707, the French C-135Fs do not carry distinctive unit markings. One *Escadron* of each Mirage IVA *Escadre* is equipped with the tankers—an example being 4/91, the 4th *Escadron* of the 91st *Escadre*.



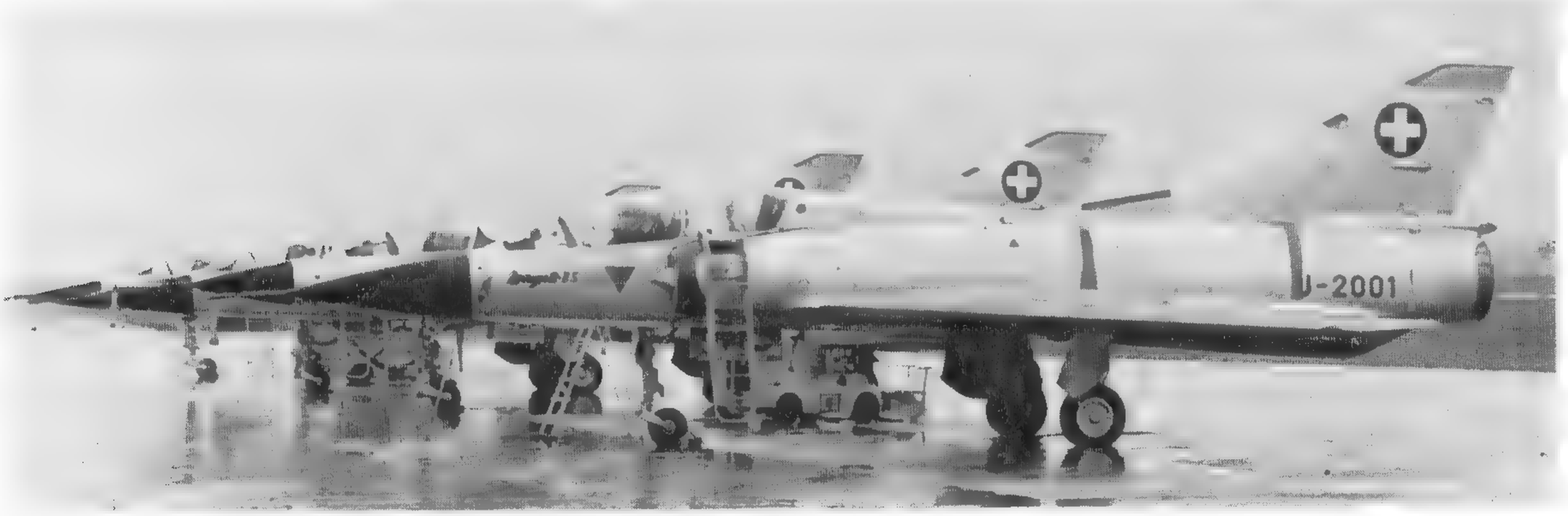
Swiss Mirage IIIS (J–2302) launches a Hughes Falcon missile at Holloman A.F.B. (New Mexico), Hq. Missile Development Center in 1965. The quartered circle under the fuselage is for observation purposes. (Photo: the late Ernst Saxer, Lucerne, Switzerland)

attack variant has so far been ordered. The second pre-production aircraft flew in September 1969 and the third about a year later. First production deliveries of the Mirage F1 are scheduled for 1972 and the French Air Force will probably eventually order a considerable number of the type, including training and reconnaissance derivatives.

Later production aircraft are to be fitted with the new SNECMA M53 "Super Atar" engine, now under development. The manufacturer has high hopes that the F series will emulate the success of the Mirage III/5 and is already courting export orders. Australia is reported to be extremely interested and the Netherlands is evaluating the Mirage F1, along with other leading fighter designs, to fulfil its requirement for an air defence interceptor.

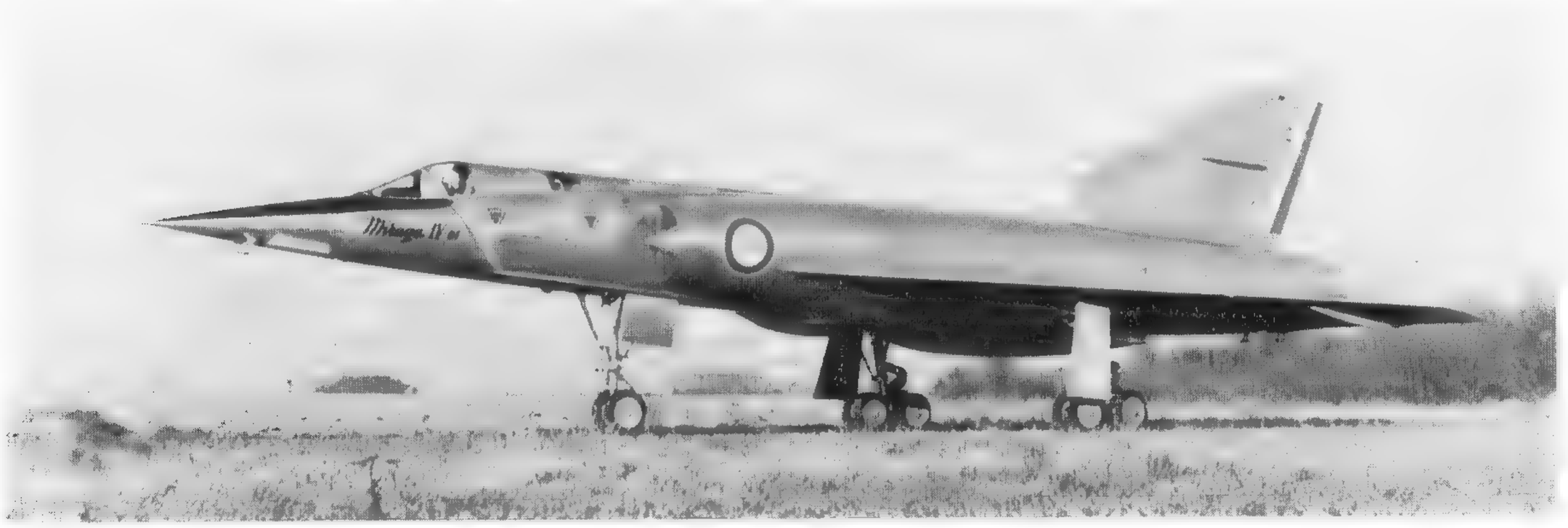
THE SWING-WING MIRAGE G

The Mirage G series arose out of the fruitless Anglo-French joint venture to develop a variable-geometry combat aircraft. The French Government withdrew from the abortive project and decided to make its own way in this field, ordering an experimental development prototype from Dassault in October 1965. This was the



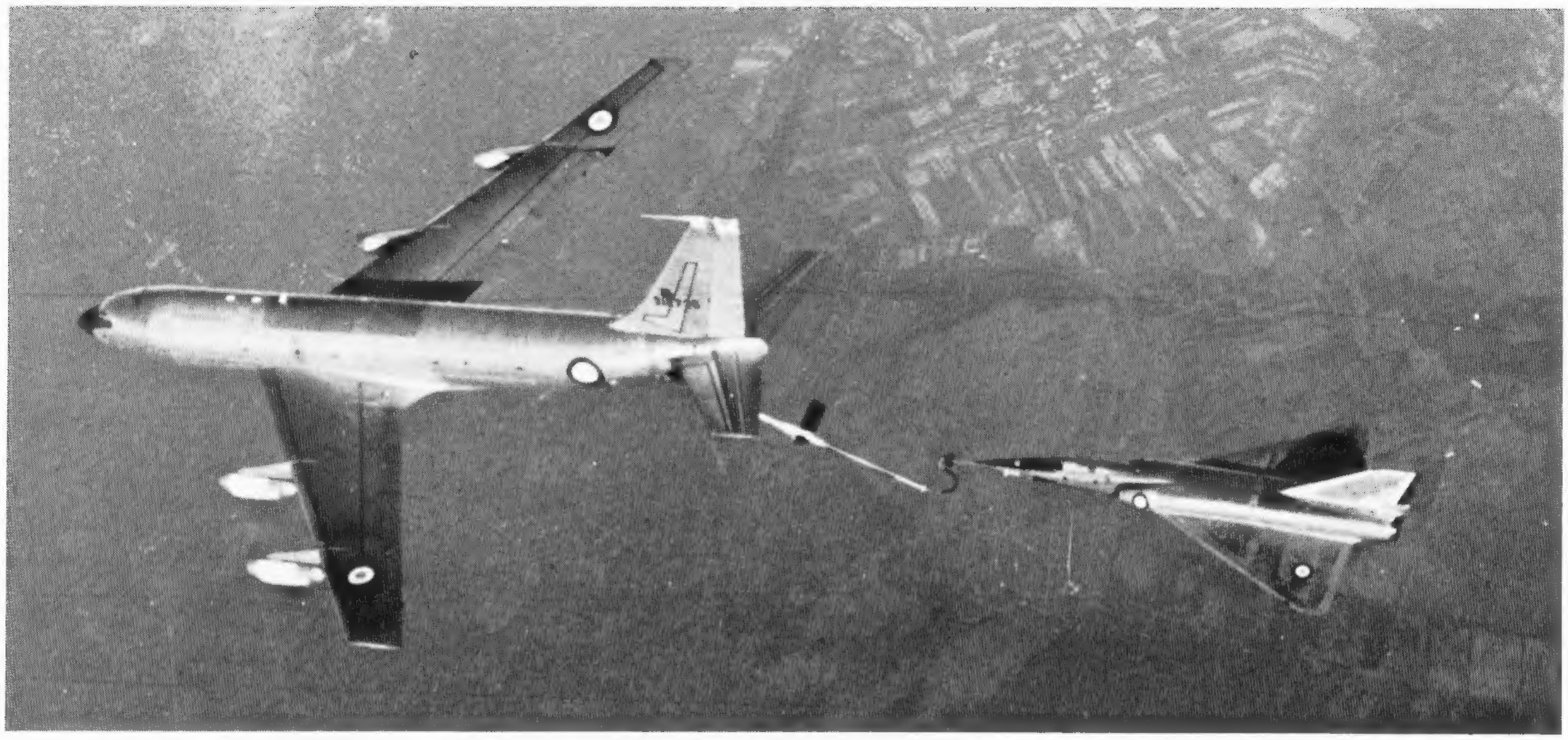
Line-up of two Mirage IIIBs two-seaters (first and third aircraft) and two IIIS single-seaters. (Photo: Keystone)

The first prototype Mirage IV bomber, which started flight trials on June 17, 1959.



Mirage IVA–02 pre-production aircraft taking off with the aid of JATO rockets.

Afterburning take-off for one of the French Air Force Mirage IVAs.



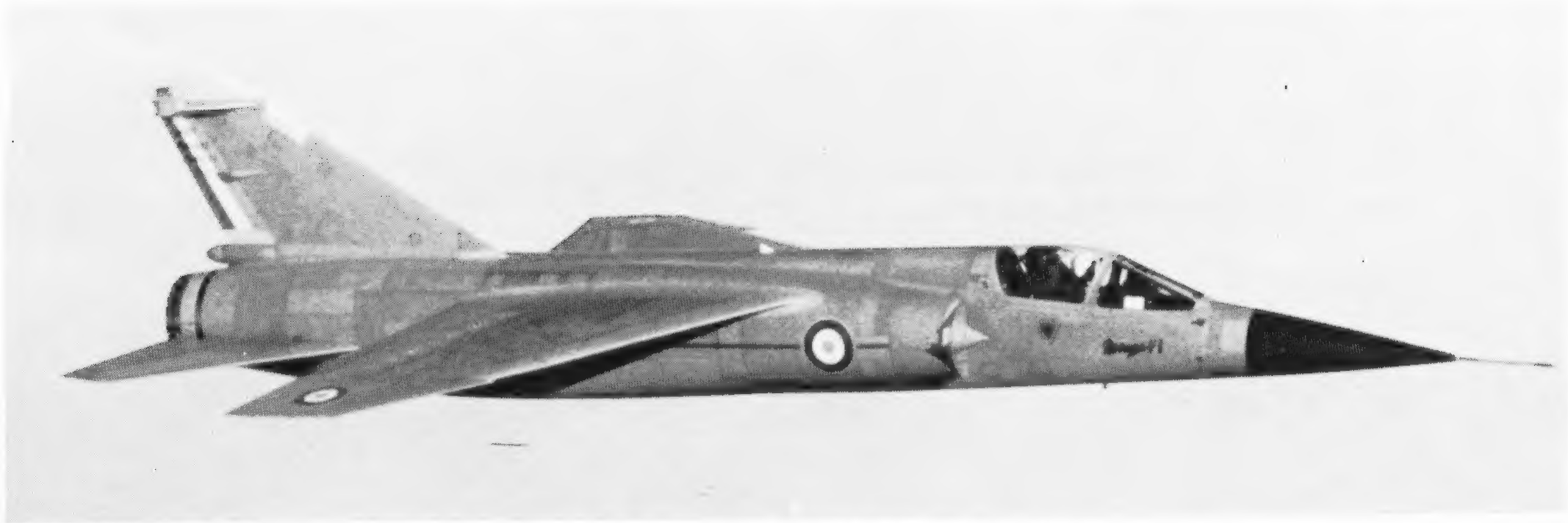
Mirage IVA refuelling from a Boeing C–135F (variant of U.S.A.F. KC–135 Stratotanker).
(Photo: Etablissement Cinématographique et Photographique des Armées)

Mirage G, which featured the same fuselage and engine as the Mirage F2 combined with a new variable-geometry wing.

The Mirage G made its first flight on November 18, 1967 and had attained Mach 2·1 within two months of beginning the test programme. This performance was combined with a 1,200-1,300-ft take-off run and the aircraft attracted the attention of the US Government. American pilots evaluated the aircraft and Ling-Temco-Vought, Inc. (LTV) acquired licence rights for the swing-wing system. Besides French and US pilots, Australian personnel, too, had the chance to fly the Mirage G. A great deal of data was obtained from the type during over 400 hours of flight testing before it was written-off in a crash in January 1971.

Dassault proposed a number of combat derivatives of the Mirage G concept, including a naval fighter variant, but, at the time of writing, French Air Staff policy on this kind of aircraft seems not yet to be decided. In 1969, the Air Force ordered two prototypes of the Mirage G4, which was conceived as a two-jet, two-seat strike and reconnaissance aircraft, but has since dropped this

Mirage F1–01 (foreground) and Mirage F2 together early in 1967.



The Mirage F1–02 pre-production aircraft. Production deliveries to the French Air Force begin in 1972.

The variable-geometry Mirage G with wings in their forward position and carrying three 1,200-litre (264 Imp. gallon) external fuel tanks.

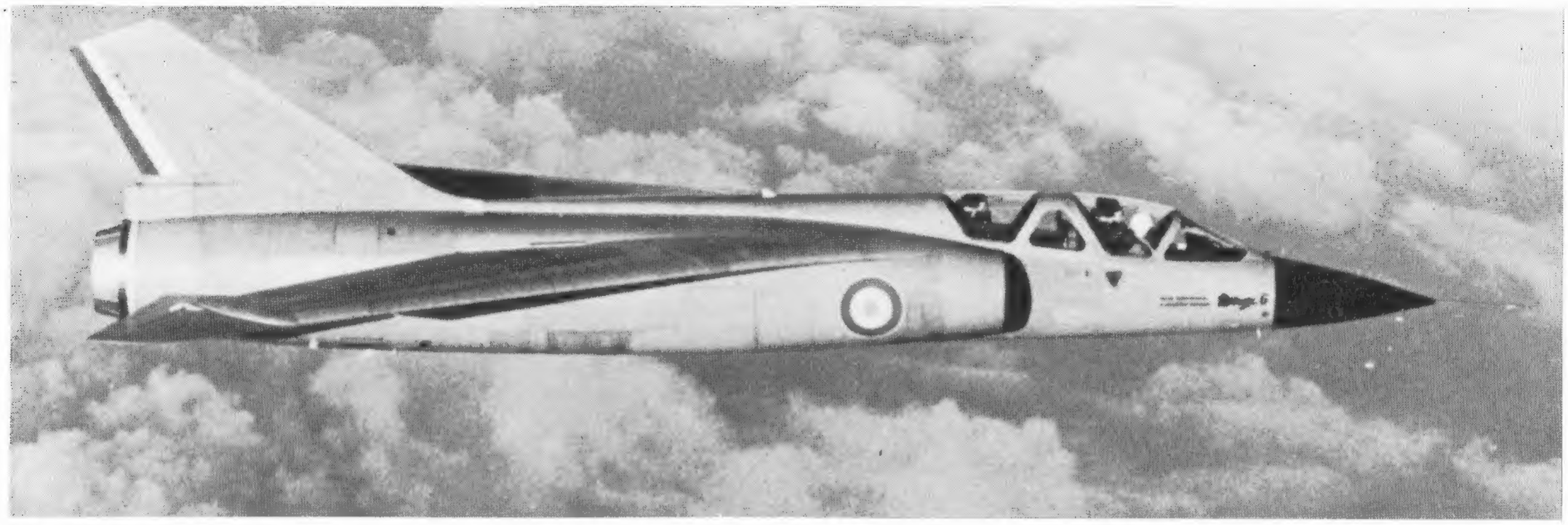
version. The G4 prototypes are being coverted to G8s during the course of construction.

The Mirage G8 is said to be considerably lighter than the G4—with an all-up weight of around 45,000-lb, compared with the G4's 57,000-58,000-lb. Precise details are not yet forthcoming but it is said to be about the same size as the F-4 Phantom, and to be designed for multi-purpose use. The Mirage G8-01 first prototype was completed early in 1971 and was due to make its first flight in April (actually May 13, achieving Mach 2·04 on May 13) and to be shown at the Paris Air Show the following month.

Like the proposed Mirage G4, the G8-01 is a two-seat, two-jet type but it is not clear if this is the layout to be adopted for the French Air Force's variable-geometry, multi-role combat aircraft—the much discussed MRCA concept. Dassault's design staff is sufficiently flexible to respond quickly to changing requirements, however, as witness the conversion of the G4 prototypes into those for the G8. The Mirage G8 is powered by SNECMA Atar 09K-50 engines; it has been stated that later aircraft will be fitted with the new M53 powerplant. The French Air Force is expected to order 40 Mirage G8s for strategic reconnaissance.

NINETEEN YEARS ON

The Mirage range has proliferated in a way which far exceeds anything the company envisaged when it responded to that 1952 specification and it is safe to say that the name will be to the fore for many years to come. Dassault has said that the initial development cost—up to the start of Mirage IIIC production—was French



Mirage G with its wings swept in the maximum 70° angle.

francs 277,000,000 or about US $50,000,000 in today's money. Sales to date are worth over Fr. fcs. 6,000 million ($1,100 million), more than 65 per cent of this income resulting from export orders.

Dassault has revealed that by early 1971, no fewer than 1,144 Mirage IIIs and 5s have been ordered, of which 720 were for export to 13 customers. The aircraft delivered by this time were logging about 100,000 flying-hours per year, and this total is increasing. At $2 million (Mirage 5) to $3 million (Mirage IIIE) per example, there is no better buy on the fighter market today—and the Mirage F1 looks like offering the same kind of value in the future. These prices, however, include support and training items—the basic FAF or fly-away-from-factory cost is even better.

Author's note: Readers will, it is hoped, appreciate the problems associated with gathering information on current military combat aircraft. Certain data are classified and "guesstimates" have had to be made on the basis of press reports and private information. However, it is to be hoped that time will show the story to be substantially correct.

Series Editor: CHARLES W CAIN

TABLE: BASIC TECHNICAL DATA OF PRINCIPAL MIRAGE VARIANTS

	Mirage IIIB	Mirage IIIC	Mirage IIIE	Mirage IIIR	Mirage 5	Mirage IVA	Mirage F1
Span (ft)	27·00	27·00	27·00	27·00	27·00	38·87	27·56
Length (ft)	50·52	48·46	49·29	50·85	51·02	77·08	49·22
Height (ft)	13·96	13·96	13·96	13·96	13·96	18·54	14·75
Wing area (ft^2)	375	375	375	375	375	840	269
Empty weight (lb)	13,820	13,040	15,540	14,550	14,550	31,965	16,314
Max. take-off weight (lb)	26,455	26,015	29,760	29,760	29,760	69,665	32,850
Maximum speed	Mach 2·15	Mach 2·15	Mach 2·2	Mach 2·15	Mach 2·2	Mach 2·2	Mach 2·2
Max. combat radius (miles)	—	745	750	—	805	—	*

* Mirage F1 endurance is given as 3 hr 45 min.

The latest in the line: the Mirage G8–01 which first flew on May 11, 1971 and achieved Mach 2·04 on its fourth flight, two days later.